

THE IRON AGE

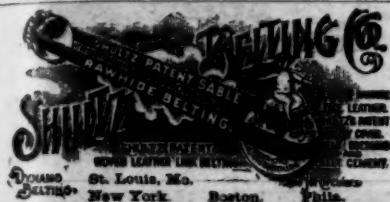
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Reading Matter Contents	page 62
Alphabetical Index to Advertisers ..	145
Classified List of Advertisers	147
Advertising and Subscription Rates ..	73



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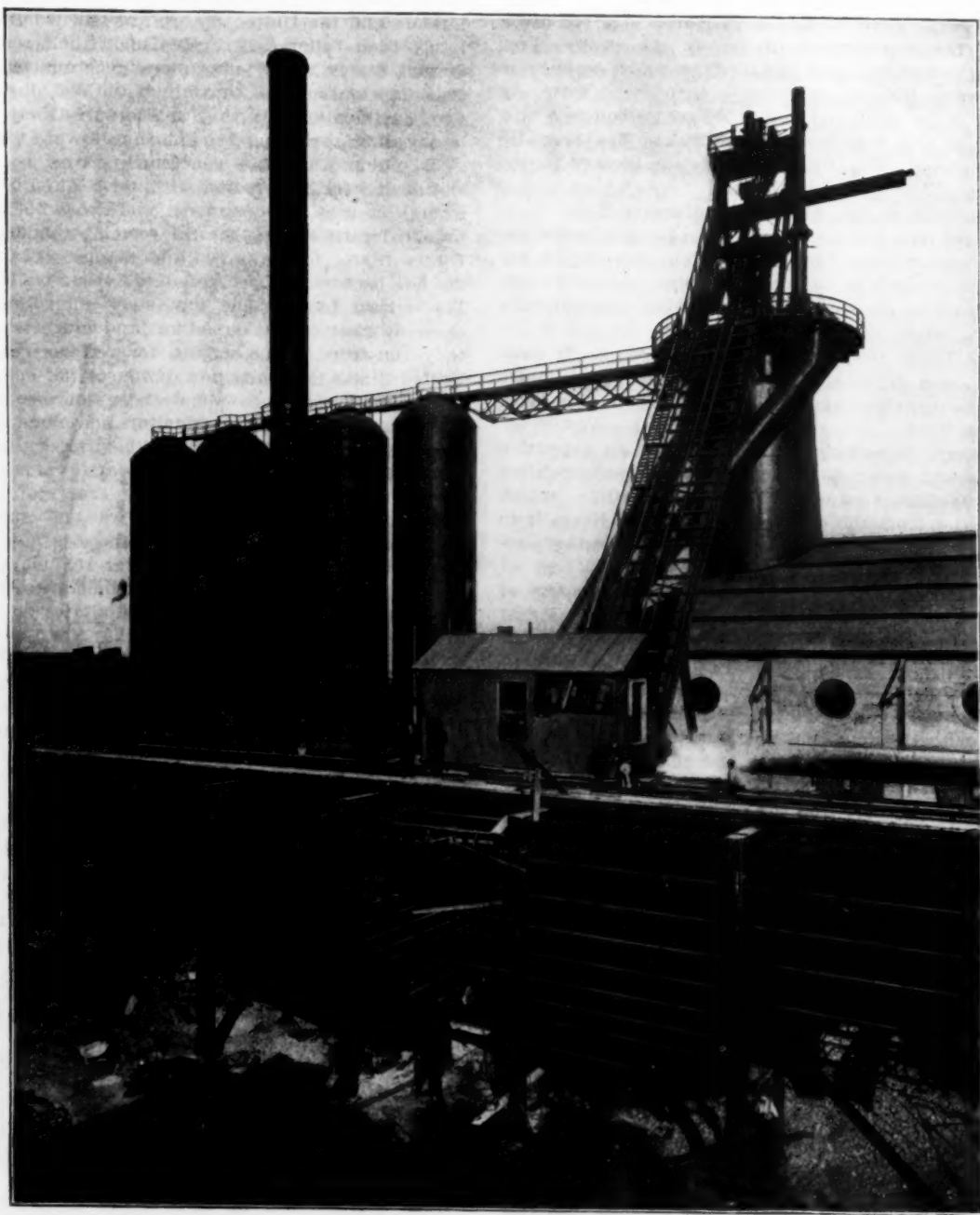
THE IRON AGE

THURSDAY, NOVEMBER 28, 1901.

The Iroquois Iron Company's New Furnace.

The Iroquois Iron Company, Chicago, have nearly completed their new blast furnace B. This is one of the most important additions now being made to the merchant pig iron blast furnace plants of the country. In point of location and in being thoroughly modern, with

The plant is well equipped with new and strongly built docks, with 20 feet depth of water, enabling the largest ore steamers to unload their cargoes right at the furnace. These docks are equipped with eight Brown Hoisting Machinery Company's hoists, bridges and conveying machines, having a capacity for unloading about 400 tons of ore per hour. Two boats can be unloaded at



THE IROQUOIS IRON COMPANY'S NEW FURNACE.

some novelties in blast furnace construction, it is destined to be an important factor in the pig iron manufacture of the Central West.

The location of the plant is admirable for the receiving and unloading of ore. The company have about 20 acres of land conveniently situated for rail and water transportation, having a dock frontage of 1000 feet on the Calumet River near its mouth at South Chicago.

the same time, the ore being placed in stock piles close to the furnace, where it does not have to be reloaded into cars. There is storage room to bring from the Lake Superior mines during the season of navigation all the ore required for the time that navigation is closed.

The new furnace B is 85 feet high and 18 feet in diameter of bosh, and is built on unusually strong foundations. It is equipped with a skip hoist and a newly

designed automatic filling device, which is the result of past experience in blast furnace practice, and is thought to be the most perfect that has yet been built. The blast is heated by four Kennedy stoves, each 18 feet in diameter and 90 feet high, with a steel draft stack 160 feet high.

The cast house is equipped with an electric traveling crane, built by the Brown Hoisting Machinery Company of Cleveland, Ohio, which picks up and carries the beds of iron to a powerful hydraulic pig iron breaking machine, which breaks the pigs and drops the broken iron into cars ready for shipment. This labor saving device is not found in any other furnace in the world.

The two new blowing engines for this furnace were built by the Allis-Chalmers Company and are of large blowing capacity, each having two fly wheels weighing 25 tons each. These, with the blowing engines at present in use in blowing furnace A, form a row of five large blowing engines, which can be used interchangeably on the two furnaces A and B. An entirely new pumping system has been installed, giving an ample supply of water for any emergencies that might arise. In addition to the old battery of 16 horizontal boilers a new battery of five Wheeler vertical boilers has been installed, giving an addition of 2000 horse-power to the power furnished by the old boilers.

At the foot of the skip hoist of Furnace B are enormous steel bins for the supply of coke and limestone. These bins are filled from drop bottom cars, which are run up on a trestle to the top of the bins. From the bottom of the bins the supply of coke is filled automatically into cars, which convey the material to the top of the furnace. While this arrangement is in vogue in most modern blast furnaces the plans adopted at Iroquois have some novelties and are designed to effect a large saving in labor.

To insure pure water for the boilers an expensive pumping and water purifying plant has been installed by the Wefugo Company of Cincinnati, Ohio, which takes water from the Calumet River and delivers it to the boilers absolutely free from any scale forming solution.

The company have also expended a large amount of money in improving Furnace A, and it is expected that the product of the two furnaces will approximate 500 tons daily.

The new furnace and its accessories were designed by Julian Kennedy of Pittsburgh, Pa., whose name in connection with the construction of an iron or steel plant is a guarantee of completeness and efficiency.

The company will endeavor to maintain for their increased product of pig iron the reputation which Iroquois iron has built up throughout the Northwest for uniformity of quality.

The officers of the company are as follows: President, M. Cochrane Armour, also resident partner of Rogers, Brown & Co.; vice-president, Wm. A. Rogers, senior partner of Rogers, Brown & Co.; secretary and treasurer, Geo. A. Tripp. Rogers, Brown & Co., Chicago, are the selling agents for the product.

The American Shipbuilding Company of Cleveland have closed a contract for another vessel, making 31 under contract for next season; by far the largest number they have ever had on their books for a single season. The boat will be built for the Mutual Transportation Company of Cleveland, of which A. B. Wolvin of Duluth is president. It will be 376 feet long, 356 feet keel, 50 feet beam, 28 feet deep. The engines will be triple expansion, and steam will be furnished by Babcock & Wilcox water tube boilers. The vessel will be built at West Superior yards, and will be delivered July 1, 1902.

In the experiments in electric traction on the Prussian military lines, says the Berlin correspondent of the *London Times*, a speed of 99½ miles an hour has been attained, the force employed being 10,000 volts. It is said that if the lines were strengthened this rate of speed would be quite practicable.

Canadian News.

Reciprocity With the United States.

TORONTO, November 23, 1901.—If the proceedings of the National Reciprocity Convention at Washington are a fair gauge of American sentiment on the subject of a *quid pro quo* trade policy, then the people on that side of the line are less ready for a modification of the Dingley act than Canadians supposed. There was an idea here that the extraordinary industrial progress realized under high protection had brought about a problem for whose solution the application of another principle was needed. Reciprocity, it was thought, would have to be more liberally provided for by the tariff law in order that new markets for the increasing surplus of American manufactures might be obtained by bargaining. As negotiations, set on foot some years ago to effect among other things a reciprocal trade agreement between Canada and the United States, are still pending, it has lately been believed here that upon their renewal the United States would offer more generous terms. For that expectation the convention at Washington gives little justification. In the United States there seems to be no strong yearning for a change toward reciprocity.

So far as Canada is concerned it must be said that the desire for reciprocity with the United States has at no time been demonstrative, and it has not been with unmixed satisfaction that the seeming tendency of the United States toward freer interchange with this country has been regarded here. Keen observers agree that Sir Wilfrid Laurier and his fellow ministers misread the sentiment of the Canadian producing classes when they construed it as longing for reciprocity with the United States. Canada now produces not only agricultural products and raw materials, but also manufactured goods. For her agricultural products and raw materials a tariff concession in the United States market would have nothing like the same value to-day as the advantages of the Reciprocity Treaty of 1854-1866. When that treaty existed there was no such transportation system in existence as there is now. Consequently the British and other over sea markets were not so accessible to Canadian commodities, nor were the border markets of the United States so tributary to interior American farmers as they are to-day. That is both because other markets were less available than they are now and because there was less American competition than there is now for the American border trade, the old reciprocity treaty proved a boon to Canada. But for the disposing of its raw materials and its agricultural products Canada is to-day comparatively independent of the United States, especially for the exportation of its surplus foodstuffs, every pound of which it can sell at ruling market prices in the United Kingdom, where the United States itself sells the greatest part of its surplus. As the Dominion now produces manufactured articles of nearly all kinds, it no longer needs the benefits of the old reciprocity treaty for the purpose of obtaining such articles. In fact, since a surplus of manufactures is produced here the great problem of Canadian industries is not only to hold the home market but to gain ground in neutral markets. In brief, Canadian farmers no longer feel that they need reciprocity with the United States, and Canadian manufacturers are strongly opposed to it. Canadian publicists not specially identified with opposition to the present Government say that reciprocity with the United States is simply a matter for adjustment on one side. Let the United States lower its tariff about 50 per cent. and then it will be on a parity with the Canadian tariff. Or let the Canadian tariff be leveled up to the American standard. In either case, they say, we shall have reciprocity, the one country giving as much or as little as the other. But recommendations for raising the Canadian tariff are as little to be expected from the Ottawa Government as recommendations for lowering the American tariff are to be expected from the Administration at Washington.

Dominion Iron & Steel Company.

The first full cargo of pig iron ever shipped from Sydney was carried by the steamer "Myra," which

cleared for Liverpool with 4500 tons on board. The steamer "Jarlsburg" has probably left before this with what will be the first cargo of Canadian iron for the United States. Her load is 4000 tons of pig iron for Boston.

Two of the Dominion Iron & Steel Company's open hearth steel furnaces are expected to be started in about a week. The blooming plant is ready for operation and it is expected that the first steel will be turned out by the first of next month. It is stated by the Sydney correspondent of the *Halifax Chronicle* that the company have sold for delivery a large quantity of steel billets to different manufacturers in the United States. The steel is to be laid down during the winter by rail.

Minor Notes.

J. B. Lauthier, for over 30 years a hardware appraiser in the Customs Department, has died at Montreal, where he was on duty.

The Pittsburgh Reduction Company, whose large Canadian plant at Shawinigan Falls, Quebec, is now being operated, is no longer to be the name under which the works will be run. A Canadian charter has been applied for, in which the concern operating the manufactory will be known as the Royal Aluminum Company, Limited. The applicants are G. G. Foster, Samuel G. Archibald and S. F. Belknap of Montreal, Arthur Davis of Pittsburgh, and F. A. Stoughton of Shawinigan. The capital stock is to be \$500,000.

Two lots have been purchased in Ottawa on the Chaudière for the purpose of constructing steel works. Letson & Burpee of Vancouver have made a shipment of canning machinery to Australia.

Cornelius Shields, general manager of the Dominion Coal Company, says that his company shipped over 900,000 tons of coal up the St. Lawrence this season. The steamers engaged in that trade will be employed in the winter carrying coal to Europe from the company's mines. A cargo is to be sent to Germany in about a fortnight.

C. A. C. J.

Nathaniel Baxter, Jr., Heads a New Enterprise.

Nathaniel Baxter, Jr., has resigned the presidency of the Tennessee Coal, Iron & Railroad Company for the purpose of accepting a similar position with the Cumberland Coal & Coke Company. The resignation becomes effective December 1. The new company are a strong organization in which wealthy Western capitalists are interested, citizens of St. Louis being prominent in the management. The property of the company lies along the line of the Tennessee Central Railway Company, of which Mr. Baxter's brother, Jere Baxter, is president.

The Cumberland company recently acquired all the coal mines and mineral property of the Crawford Coal & Iron Company. The holdings of the company are about 345,000 acres of coal lands, with eight large coal mines now in operation. The property lies on the Cumberland plateau and is said to comprise coal and iron ore deposits which rank among the great mineral deposits of the world. Mr. Baxter has acquired a large interest in the company, and on the solicitation of his new associates concluded to accept the presidency and devote his time and energy to the development of the business. He leaves the Tennessee Company with perfect harmony existing between himself and the other officers. Mr. Baxter's connection with the latter company dates back to 1884, when he became vice-president. In 1887 he was elected president and has served in that capacity 14 years. When he assumed charge of the affairs of the company they owned the coal mines at Tracy City, Tenn., with an output of 700 tons of coal per day, and the Sewanee Furnace, with a capacity of about 100 tons of iron per day. They had about 350 employees. He leaves the company owning 20 furnaces, with an output of 2500 tons a day; innumerable coal mines, with an output of 7500 tons per day; a steel mill with an output of 1000 tons per day, and a number of foundries, rolling mills, machine shops, &c., and an army of employees about 10,000 strong.

It is Mr. Baxter's intention to proceed at once with

the work of opening the undeveloped coal mines. Many coke ovens are to be built, and in time will come the question of blast furnaces.

Notes from Mexico.

Work of the Pan-American Congress.

DURANGO, MEXICO, November 19, 1901.—After a fortnight's hard work—work which made severe demands both upon the cerebral and the digestive organs of the delegates—the Pan-American Congress has taken a recess. The various committees appointed to deal with the long list of important topics which is to receive the attention and action of the congress are still holding their meetings, only turning aside from the path of duty to participate in one or other of the many social entertainments provided by their associates or the hospitable people among whom their lot is temporarily cast.

The telegraph will have made most of the readers of *The Iron Age* familiar with, at least, the most important incidents of the preliminary sessions of this gathering of the representative minds of North, Central and South America. These reports, however, have been necessarily condensed. The very great importance of the conference in its relation to the peace of the continent and its commercial and industrial prosperity is sufficient excuse for noticing in more detail some of the business already accomplished by the congress with the object of furthering both of the foregoing aims. Perhaps the most weighty matter which has yet come to the front was the introduction by the Mexican delegates of a project of compulsory international arbitration. A synopsis of the provisions of the measure has been given in the press dispatches. It is only necessary to explain here that the treaty provides for the submission of disputes "which do not involve the honor nor independence of the nations who shall be parties to the treaty" to arbitration, but at the same time nations which are parties to the treaty have the right to withhold from its operation any questions which they think their interests demand should not be submitted to it, even though such questions come within its scope. In the arbitration scheme as submitted is enumerated a list of controversial subjects which cannot be considered as legitimate matters for its adjudication. To a practical, non-political observer the project seems to be harmless and unsatisfying. This treaty has been referred to the Committee on Arbitration, which is composed as follows: Argentine, Antonio Bermejo; Bolivia, F. E. Guachalla; Brazil, J. H. Duarte Pereira; Colombia, Carlos Martinez Silva; Costa Rica, J. B. Calvo; Chile, Alberto Blest Gana; Ecuador, L. F. Carbo; Santo Domingo, L. F. Carbo; Salvador, Dr. Estupinian; United States, W. I. Buchanan; Guatemala, Antonio Lazo Arriaga; Haiti, J. N. Leger; Honduras, Fausto Davila; Mexico, Emilio Pardo; Nicaragua, L. F. Corea; Paraguay, Cecilio Baez; Uruguay, Juan Cuestas; Peru, Isaac Alzamora; Venezuela, Jose Gil Fortoul.

The committees appointed to deal with subjects of international importance more or less affecting the interests represented by *The Iron Age* cover water transportation, commerce and reciprocity, Pan-American court of equity and claims, Pan-American railroad, reorganization of the Bureau of American Republics, international law, Pan-American bank and exchange, patents, trade-marks, weights and measures, resources and statistics, interoceanic canal, and agriculture and industries.

J. J. D.

The York Mfg. Company, manufacturers of ice making and refrigerating machinery, York, Pa., have during the present year sold 96 machines of an average capacity of 80 tons refrigeration. They believe that this makes a record in their line of business not equaled by any other manufacturer.

The Manufacturers' Club of Philadelphia is reported to have in preparation a memorial to Congress indorsing the metric system.

Production of Illuminating Gas from Coke Ovens.

BY F. SCHNIEWIND, PH.D.

[The paper read under the above title by Dr. Schniewind before the Gas Section of the recent Engineering Congress at Glasgow contains a great deal of interesting and valuable information relative to the construction and operation of by-product coke ovens, herewith reproduced. We omit the portion of the paper relating purely to the subject of illuminating gas, referring those of our readers who desire to secure the entire paper to the United Coke & Gas Company, 277 Broadway, New York, who have reprinted it in pamphlet form for distribution.—THE EDITOR.]

The object of this paper is to describe the progress which has been made in the United States and Canada in recovering illuminating gas from by-product coke ovens. A clear account of this cannot be given without repeating some of the previous statements published.¹

Before entering upon the subject I cannot resist the temptation of discussing its bearing upon the vexed smoke problem of large cities.

The Fuel Supply of Large Cities.

The question of the fuel supply of large cities is of the greatest importance. Notwithstanding this fact, its study has been neglected in a distressing manner. We still see the large manufacturing cities in Great Britain, as well as in the United States and other countries, darkened and begrimed by clouds of smoke and soot resulting from the use of bituminous coal. The annual expenditure for the maintenance of buildings, &c., is increased, not to mention the deleterious effect on the health of the people.

The subject has been discussed by George Beilby in

Of this amount of bituminous coal only a very small percentage is subjected to dry distillation, which converts it into smokeless coke (see Table II); the remainder is almost entirely burned directly under conditions which are favorable to the production of smoke.

This figure does not include the coal coked in beehive

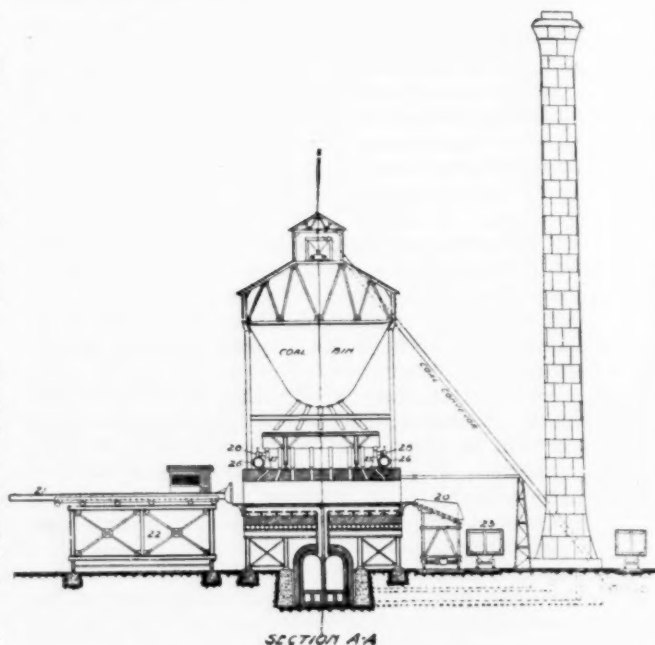


Fig. 2.—Section of Plant at A A, Fig. 1.

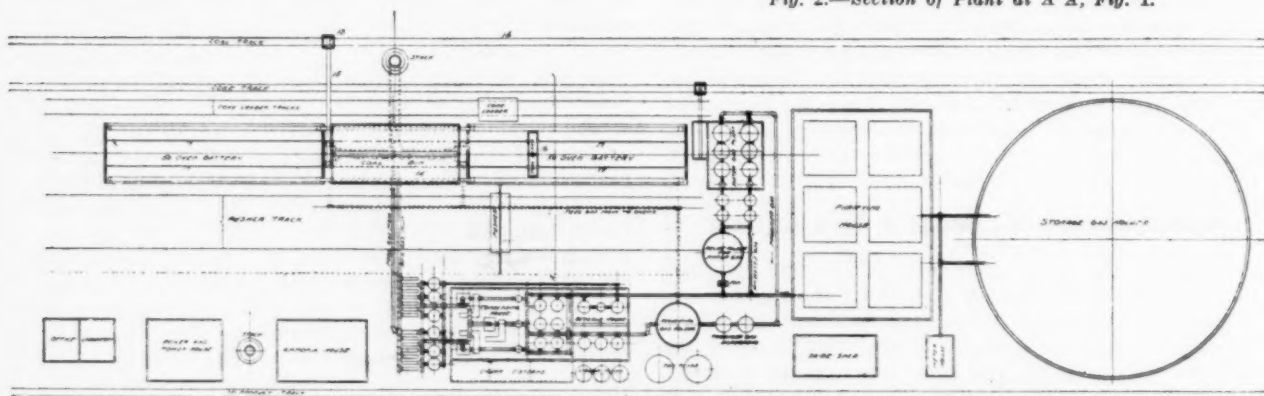


Fig. 1.—General Plan of By-Product Coke Oven Plant for the Manufacture of Illuminating Gas.

PRODUCTION OF ILLUMINATING GAS FROM COKE OVENS.

his presidential address before the Society of Chemical Industry.² He gives the following table:

Table I.—Consumption of Coal in the United Kingdom in 1898.

1. Coal for the Generation of Power in Industries:	Long tons.
Railways	10,000,000 to 12,000,000
Coasting steamers.....	6,000,000 " 8,000,000
Mines	10,000,000 " 11,000,000
Factories	38,000,000 " 40,000,000
Total	76,000,000
2. Coal for the Generation of Heat in Industries:	
Blast furnaces.....	16,000,000 to 18,000,000
Steel and malleable iron works	10,000,000 " 12,000,000
Other metallurgical works..	1,000,000 " 2,000,000
Chemical works, potteries and glass works.....	4,000,000 " 6,000,000
Gas works.....	13,000,000
Total	46,000,000
3. Coal for Domestic Purposes.....	35,000,000
Total consumption, long tons.....	157,000,000

¹ (a) Professor Hoffmann's extract from Dr. F. Schniewind's test report on Dominion coal at Glassport, Pa., "The Production of Illuminating Gas in By-Product Coke Ovens," *Engineering and Mining Journal*, October 8 and 15, 1898; *Progressive Age*, 1898, p. 575. (b) "The Everett Coke Oven Gas Plant," *Progressive Age*, August 15 and September 1, 1899; January 1, 1900; *Journal of Gas Lighting*, Vol. LXXIV, pp. 1,114, 1,176; Vol. LXXV, p. 274; Vol. LXXVII, pp. 616, 679, "40, 820. (c) "Otto-Hoffmann Coke Oven Practice," *American Gas Light Journal*, Vol. LXXVII, p. 444. (d) "By-Product Coke in the United States," *The Iron Age*, Vol. LX, December 9, p. 24. ² *Journal of the Society of Chemical Industry*, Vol. XVIII, p. 643; *Journal of Gas Lighting*, Vol. LXXIV, p. 175.

ovens without the recovery of by-products, which amount is approximately 12,500,000 long tons.

Mr. Beilby suggests two solutions of the smoke problem: 1, The use of improved appliances for the combustion of the raw coal, and, 2, the transformation of the raw coal into smokeless fuel by carbonization or gasification.

Table II.—Coal Subjected to Dry Distillation in the United Kingdom in 1898.

	Long tons.
Gas works.....	13,000,000
Blast furnaces.....	2,000,000
By-product coke ovens.....	1,250,000
Total, long tons.....	16,250,000

We are of the opinion that the first method offers only a partial relief, and, furthermore, that it is a wasteful one, because valuable products can be recovered from bituminous coal by dry distillation which are wasted in the direct combustion of raw coal. The second method—i. e., that of the conversion of the raw coal into a smokeless fuel by carbonization—seems to us the most rational and economical solution of the problem. This method has, in the meantime, developed to a very considerable extent in the United States. The United Coke & Gas Company of New York have introduced into the United States by-product coke oven systems exploited by Dr. C. Otto & Co. of Germany—chiefly the Otto-Hoffmann coke ovens. A large number of these

plants have been erected (see Table IV). In Germany these plants are operated almost entirely for the production of metallurgical coke, while the surplus gas is burned under boilers. A number of the American plants

A very large proportion of the coal, as given in Mr Bellby's table, is consumed in or near large cities, and we believe this coal should be subjected to a carbonizing process before use. This would supply to the city at

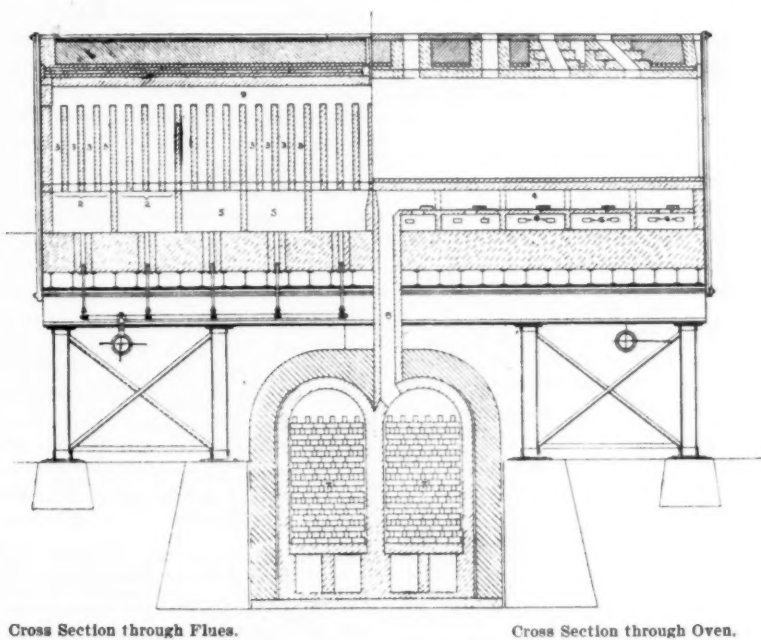


Fig. 3.—Diagram Showing Schniewind Type of Oven.

operate in the same way, but several of the later plants are designed for the exclusive manufacture of domestic and railroad coke and illuminating gas.

once a cheap smokeless fuel suitable for practically all purposes. We will show further on that the use of coke instead of coal would not be coupled with a great ex-

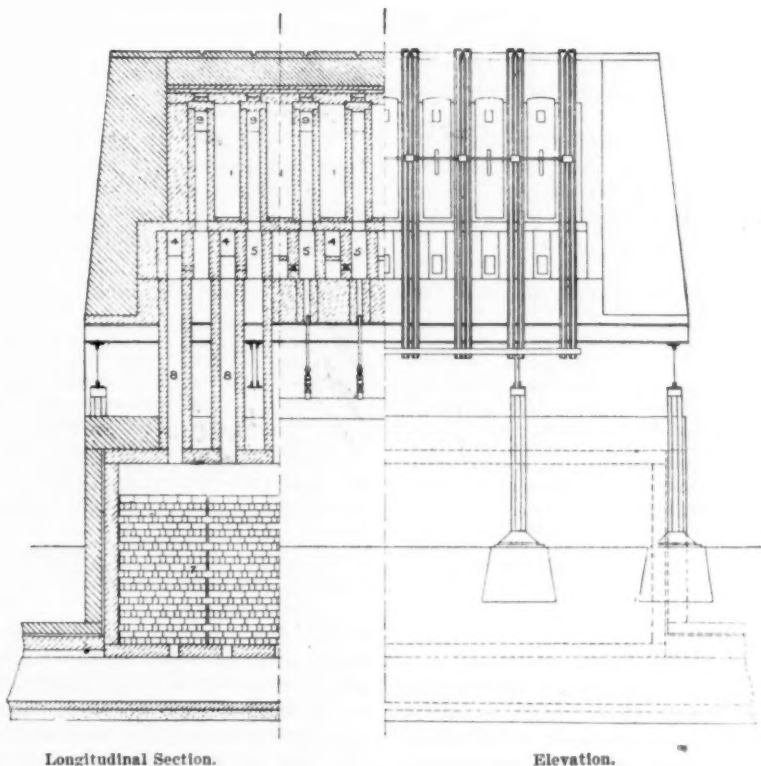


Fig. 4.—Diagram Showing Schniewind Type of Oven.

PRODUCTION OF ILLUMINATING GAS FROM COKE OVENS.

Table III.—Fuel Statistics of Some American Cities for 1900.

	Bituminous Coal.		Anthracite coal.	
	Quantity used. Net tons.	Price per net ton.	Quantity used. Net tons.	Price per net ton.
New York*.....		\$2.50 to \$3.50		\$3.50 to \$4.00
Philadelphia..	1,700,000	2.00 "	3,300,000	4.00 " 4.50
Boston	2,050,000	2.50 "	1,950,000	4.00 " 5.00
Chicago	7,000,000	2.00 "	1,600,000	5.00 " 6.00

*The total amount of bituminous coal and anthracite for domestic consumption and the supply of steamers in New York and adjacent cities belonging to the port of New York is estimated at 15,000,000 net tons.

pense to the fuel consumer. By the erection of large carbonizing works near or in large cities the smoke problem would find its ready solution, and at the same time a great saving, from a national economic point of view, would result from the recovery of the valuable by-products and gas.

How urgent the demand for smokeless fuels has become is plainly shown by the fuel statistics of some of the larger American cities. In the United States anthracite is found in a small district in Pennsylvania,

while bituminous coal is scattered over almost all the States east of the Mississippi. Notwithstanding the close proximity of the bituminous coal fields to some of the larger cities, enormous quantities of anthracite are brought to them from a great distance, and consequently at great expense.

Table III demonstrates how enormous the demand for smokeless fuel has become, and, furthermore, that a great premium is paid for the smokeless character of a fuel. The prospects are, therefore, encouraging for the erection of carbonizing plants near large cities.

General Description of the Process.

In order to facilitate an understanding of the more detailed account of the process, a general description of the combined coke oven and gas process is first given, comparing it at the same time with ordinary gas retort practice.

Charging Capacity.—The coke ovens have a charging capacity of 16,000 pounds of coal, which is all carbonized in 24 hours and less. Ordinary gas retorts have a charging capacity of only 300 to 400 pounds, which is carbonized in about four hours.

Labor Saving.—On account of the increased charge, all the operations around the coke ovens are performed by machinery, which results in a saving of labor per ton carbonized, as compared with the present coal gas system.

Quality of Coke.—On account of the larger charges and the peculiar construction of the coke ovens, a far better coke is produced, as compared with that obtained in ordinary small gas retorts. The coke oven yields, if required, a coke which satisfactorily sustains the burden of a modern large size blast furnace. It is consequently of much higher value than gas works coke. The coke oven may also produce domestic coke far superior to gas works coke.

By-products.—The coke oven, like the ordinary gas retort, saves tar and ammonia (and eventually several additional by-products). The coke oven yields, however, a higher percentage and a better quality of these products than the gas retort.

Heating Retorts.—The ordinary gas retort produces the heat necessary for carbonizing the coal by burning a part of the resulting coke under the benches. In the coke oven process all the coke is saved, while a part of the resulting gas is burned under the ovens.

Fluctuation of Gas Consumption.—The process, as described, gives the same amount of gas every day in the year. In order to meet the fluctuations of the demand an auxiliary producer or water gas plant is provided. This furnishes a cheap fuel gas from the cheapest coal or refuse coke, which can be used for heating the ovens. More coke oven gas becomes available thereby.

Transferring Illuminants.—By thus increasing the gas output of the plant, the candle power is reduced, because the gas becomes poorer the further the carbonizing process progresses. In order to equalize the candle power, the poor gas is washed with tar oil, which robs it of its vaporous illuminants (the benzol, &c.). The tar oil on subsequent distillation gives up these illuminants, and is then used for another absorption, while the illuminants are directly added in vaporous form to the rich gas until the desired candle power is obtained. In summer time only a small part of the benzol from the poor gas is needed to produce a gas of, say, 20 candle-power. The remainder is therefore condensed to a liquid state, and stored for use during the increased demand in winter.

Independence from Enriching Materials.—By this process a gas of high illuminating value is manufactured from coking coal alone. No oil or other enriching material is required.

Plants Built by the United Coke & Gas Company in the United States and Canada.

Since the autumn of 1898 the large carbonizing plant of the New England Gas & Coke Company has been in operation at Everett, near Boston; and the readiness with which the coke is disposed of, for domestic and locomotive fuel, is conclusive proof of the above statements. This plant of 400 Otto-Hoffmann ovens was erected by the United Coke & Gas Company. It produces 1400 long tons of coke per day, which is almost entirely used in Boston or vicinity. This amount is disposed of as follows:

	Long tons.
To railroads for locomotive fuel.....	700
To steam plants.....	350
For domestic purposes.....	350

The coke used by the railroads is employed in the suburban passenger traffic with the greatest success. Up to 6,500,000 cubic feet of illuminating gas is sold to various gas works at Boston. It averages 19 candle-power without enriching. Table IV enumerates the

Table IV.—By-Product Coke Ovens Erected, or in Course of Construction, by the United Coke & Gas Company.

No.	Owners.	Location.	Erected in.	No. of ovens.	Coke used for	Gas used for
1	Cambria Steel Company.....	Johnstown, Pa.	1895 and 1898	160	Blast furnace.....	Fuel.
2	Pittsburgh Gas & Coke Company.....	Glassport, Pa.	1896	120	Blast furnace and domestic.....	Fuel.
3	New England Gas & Coke Company.....	Everett, Mass.	1898	400	Domestic and locomotive.....	Illuminating.
4	Dominion Iron & Steel Company.....	Sydney, C. B.	1900	400	Blast furnace.....	Fuel.
5	Hamilton Otto Coke Company.....	Hamilton, Ohio.	1900	50	Foundry and domestic.....	Illuminating.
6	Lackawanna Iron & Steel Company.....	Lebanon, Pa.	1901	232	Blast furnace.....	Fuel.
7	Lackawanna Iron & Steel Company.....	Buffalo, N. Y.	1901	564	Blast furnace.....	Fuel.
8	South Jersey Gas, Electric & Traction Company.....	Camden, N. J.	1901	100	Foundry and domestic.....	Illuminating.
9	Maryland Steel Company.....	Sparrow's Point, Md.	1901	200	Blast furnace.....	Illum. and fuel.
10	Michigan Alkali Company.....	Wyandotte, Mich.	1901	15	Burning lime.....	Fuel.

Total.....2,241

Separation of Gases.—A ton of coking coal produces a total of about 9000 cubic feet of gas, of which 5000 cubic feet are required for heating the ovens, while the remaining 4000 cubic feet are available surplus. Instead of taking these 4000 cubic feet from the average gas mixture, the gas is separated into two fractions—viz., the first, or rich fraction, 4000 cubic feet, which is sent to the city; the second, or poor fraction, 5000 cubic feet, which is used for heating the ovens. The first fraction is of much higher candle power than the second, and can be used directly without any further enriching.

Greater Variety of Coals Available.—As only the richer part of the gas is used, almost any bituminous coal can be charged. Even from the poorest kind of coal a gas of higher candle power is obtained by coke ovens than from the richest gas coals by ordinary retorts. Thus, in the selection of coal, we are governed chiefly by the character of the coke desired.

other plants erected by the United Coke & Gas Company, or in course of construction.

From this table it is seen that four of these plants are producing domestic coke and four illuminating gas. The annual carbonization of all these plants is about 4,000,000 net tons of coal. There can be no doubt that, on account of the general interest taken in the process in the United States, a very rapid introduction of this by-product coke oven system for carbonizing plants near large cities will follow, quite aside from its substitution for the obsolete and wasteful beehive coke oven for the manufacture of metallurgical coke.

Description of a Plant of 100 Coke Ovens.

In order to adapt the Otto-Hoffmann process, as practiced in Germany, to the new requirements, it had to undergo many changes. I will describe a plant consisting of 100 by-product coke ovens of the latest type of the United Coke & Gas Company. (See Figs. 1 to 4.)

Ovens.—The ovens are arranged in two groups or batteries of 50 ovens each. Each oven, 1, is an air tight retort, consisting of a rectangular chamber 43 feet 6 inches long, 17 inches wide and 6 feet 6 inches high. The ovens are placed side by side, and are supported on a steel structure, consisting of light I-beams, running the length of the battery, which rest on cross girders supported by steel columns. (United States patents Nos. 627,595, 644,368, 644,369, 668,225, 673,928. British patents Nos. 13,325, 1899; 3335, 1900; 10,589, 1900; 993, 1901. Further patents pending.)

The construction allows the brick work to be inspected at all points. The primary object, however, is the uniform distribution of fuel gas to the combustion chambers for heating the oven retorts. The retorts are separated by hollow walls, which are divided into ten compartments, 2, each compartment containing four, preferably vertical, flues, 3. An air chamber is located directly under the retort 4. Alongside this chamber, and directly under the vertical flues above referred to, are ten combustion chambers, 5. The gas supply to each of the chambers is controlled independently, and a uniform heat is maintained throughout the entire length of the oven. The air for combustion is admitted through opening 6 in the wall between the air and the combustion chambers. The air is heated to 1800 degrees F. by a pair of regenerators, 7, placed together under the center of the battery and running its entire length. A vertical flue, 8, conducts the air from the regenerator to the air chamber 4 under the oven.

The well-known Siemens principle is used in operating the air regenerators, with reversals every 30 minutes. The fuel gas is reversed at the same time as the air by means of a suitable valve; but the gas is not regenerated. The gas unites with the hot air in five combustion chambers, 5, ascends through the vertical flues 3 to a horizontal flue, 9, above, through which it passes and descends through the five chambers in the other end of the oven, thence through the air chamber 4 and vertical flue connection 8 to the regenerator 7 and through the reversing valves to the stack. The regenerators are built entirely independent of the oven structure, so that their expansion does not affect the oven brick work.

Coal Handling.—A steel coal storage bin, 12, of a capacity equivalent to about two days' coal consumption is placed between the batteries. The coal is elevated to the bin from a hopper, 13, placed under the coal receiving track 14, by a belt or other type of conveyor, 15. A coal larry, 16, of 8 tons capacity, runs on a track, 17, on the top of the batteries and under the coal bin. The larry consists of a long narrow bin with eight spouts in the bottom, through which the coal is run into the oven retort through holes in the top of it, and is leveled by means of a bar worked through a small opening in the doors at the ends of the oven. The larry is operated by an electric motor and receives its load of coal from the storage bin, under which it passes. A very dense metallurgical coke can be produced and the output of an oven largely increased by compressing the coal into a mold slightly smaller than the retort and charging the mass through the oven door.

Coke Handling.—Upon the completion of the coking process the oven doors are raised and the mass of 6 tons of coke is pushed upon a movable platform, 20, by means of a ram, 21. The pushing ram, as well as the machine 22 on which it is mounted, are operated by electric motors. The coke, after being pushed upon the platform, is quenched and allowed to cool. The platform 20 is then tilted by an electric motor and the coke slides off into cars, 23, which run on a track at the back of the machine.

Gas Mains.—The gas distilled from the coal during the coking process is conducted to the condensing house by two independent systems of mains, 25 and 26. These mains run on top of the battery the entire length—one on each side. Each oven is connected to each main by a vertical pipe, 27, and valve, 28.

During the first part of the process the rich gas is taken off through the rich gas main 25. The valve to this main is then closed and the balance of the gas is taken off through the poor gas main 26. When the

coking is completed the valve to the poor gas main is closed, disconnecting the oven from both mains.

Condensing Plant.—The gas leaving the coke ovens is divided into two fractions—viz., the first fraction or rich gas, which is sent out as illuminating gas, and the second fraction or poor gas, which is used for heating the ovens. The cooling of the gas and the removal of tar and ammonia are done in the usual apparatus, hence it is not necessary to discuss it here in detail. Both the rich and poor gases are treated in the same manner. The following is the sequence of the apparatus, as shown in the general sketch of a gas plant for coke ovens, Fig. 5: 1 and 7 are air coolers, 2 and 8 are multitubular water coolers, 3 and 9 are tar extractors, 4 and 10 are exhausters, 5 and 11 are second coolers intended to remove the heat produced by the compression of the gas in the exhausters and 6 and 12 are ammonia washers.

The rich gas, when freed of tar and ammonia, leaves the condensing plant and passes through pipe 42 into the purifying plant 37, and from there into a large storage gas holder for illuminating gas, from which it goes into the city. The poor gas, after being treated in the same manner as the rich gas, leaves the ammonia washers 6 and passes through two benzol scrubbers, 13 and 14. After having been freed of its benzol it flows through pipe 15 into the oven gas holder 16. Here it is mixed with producer gas, when necessary (which will be discussed later), and carried to the ovens for heating by the pipe 17. The benzol extracted from the poor gas is then transferred to the rich gas, so as to increase its candle-power.

The tar oil by which the gas is washed runs first from tank 18, through the second benzol scrubber 14, into tank 19. From here it is supplied by pump 19a into the first benzol scrubber, 13. The tar oil enters from tank 18 with about 5 per cent. of benzol, and finally leaves washer 13 with about 15 per cent. of benzol. It is collected in tank 20. From here it is fed by pump 20a into still 21, in which the benzol is reduced again to about 5 per cent. The exhausted oil collects in tank 22. From here it is taken by pump 22a through the oil cooler 23, in order to be again supplied to tank 18 for a new absorption.

A small additional plant is needed (which, however, has been omitted in this sketch) by which a small percentage of the oil is revived, in order to keep it active for benzol absorption. This consists of a simple tar still and condenser, in which the tar oil is freed from most of the naphthalene and other hydrocarbons incidentally absorbed. The presence of an excessive percentage of them in the tar oil would interfere with a complete benzol absorption.

The benzol vapors which are driven off in still 21 are carried into the rich gas system by means of a gas current coming from the pressure side of the rich gas condensing plant. This greatly facilitates the distillation of tar oil passing through the still. The mixture of the gas and benzol vapors then passes through pipe 24, preferably to the inlet of the exhausters, 10, of the rich gas condensing plant. In this manner the vapors do not come in contact with a large body of tar, which would be liable to absorb a part of the benzol.

[It is unnecessary to describe here the details of the benzol distilling plant. A great number of these are in operation in connection with German by-product coke plants.]

Auxiliary Gas Plant.

When operating the plant continuously, practically the same amount of surplus gas is obtained every day, and the plant would not be adapted to follow the fluctuations in the gas consumption. The plant is consequently so designed that its surplus gas will meet the minimum requirements in summer time, and the increased requirements in winter are made up by an auxiliary gas plant. Two ways suggest themselves in connection with the by-product coke ovens:

1. **An Auxiliary Producer Plant.**—Producers are operated preferably on coke screenings and refuse coke, which finds a sale only at a reduced price. The producer gas thus obtained is mixed with the poor coke

oven gas and burnt under the ovens. In this manner more rich gas becomes available. Such a plant is now in operation at the New England Gas & Coke Company's

volume of rich gas. (This plan has not been shown in the accompanying sketches.)

2. Auxiliary Water Gas Plant.—Instead of a producer

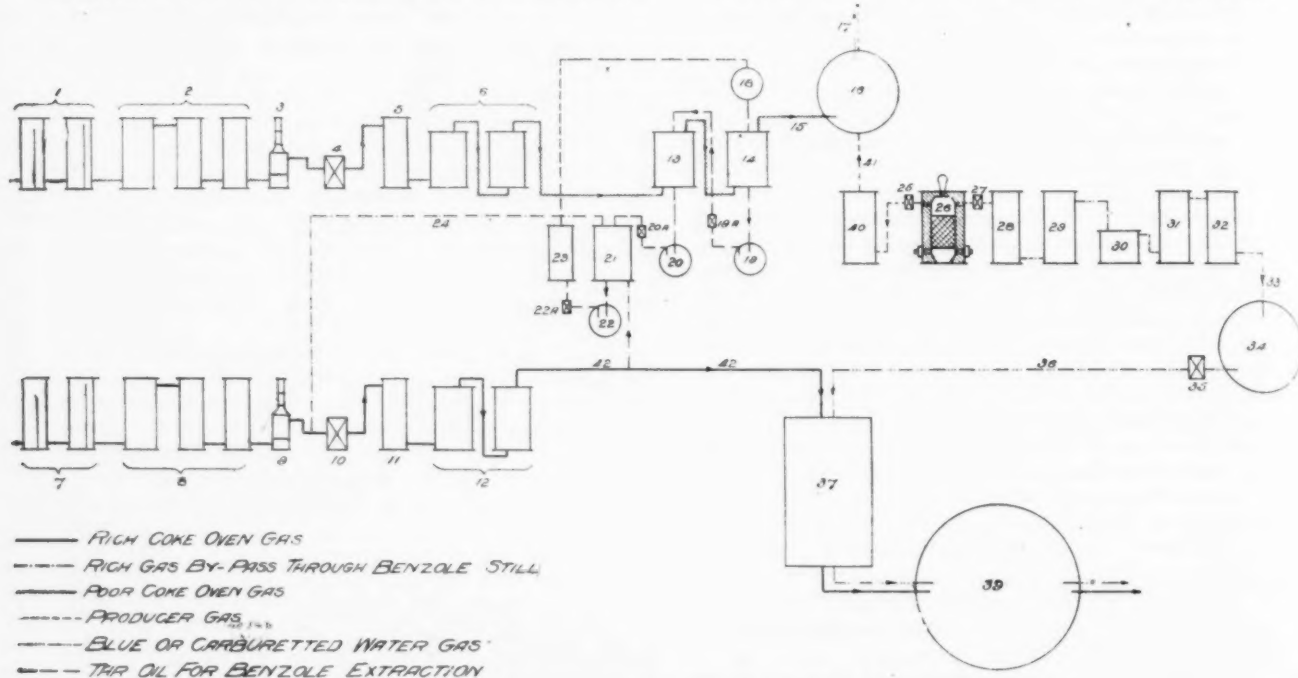


Fig. 5.—Arrangement of Gas Plant for Coke Ovens.

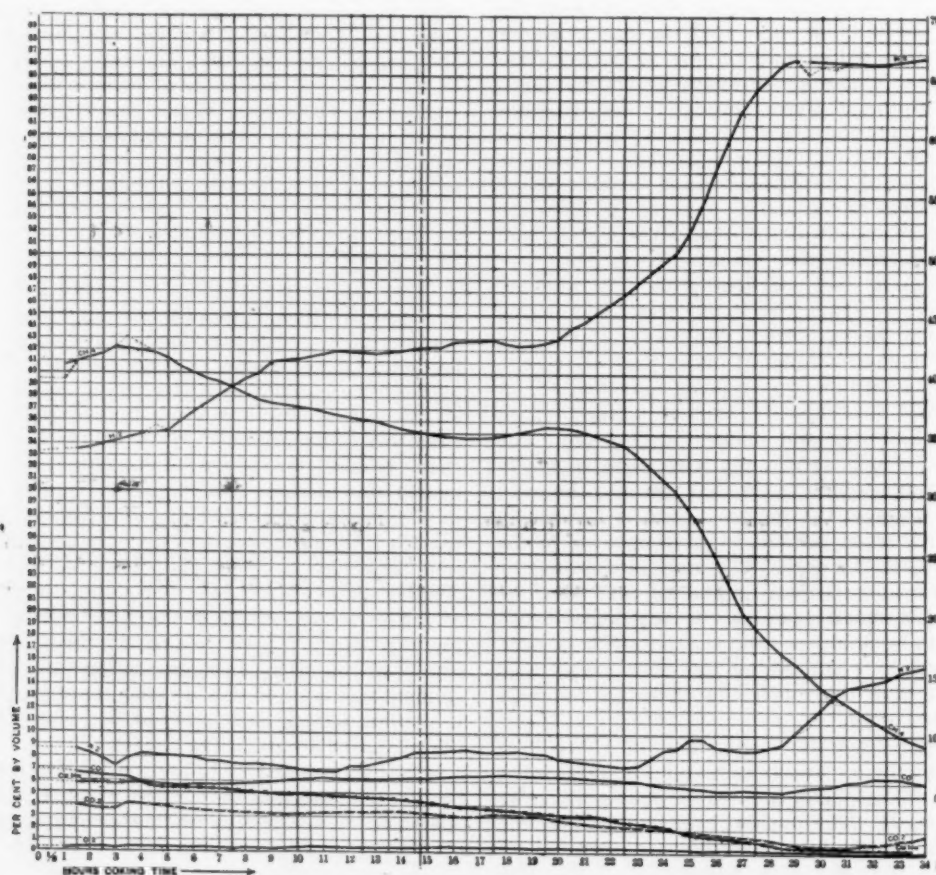


Fig. 6.—Analyses of Dominion Coal Gas Produced in Coke Oven Test.

Surplus gas produced during the first 14 hours 46 minutes. Volume per long ton, 5143 cubic feet = 49.5 per cent. Average analysis:

CmHn	5.2
CH ₄	38.7
H ₂	38.4
CO	6.1
CO ₂	3.6
O ₂	0.3
N ₂	7.7
Total	100.0

Oven heating gas produced during remaining 10 hours 10 minutes. Volume per long ton, 5,247 cubic feet = 50.5 per cent. Average analysis:

CmHn	2.4
CH ₄	29.2
H ₂	50.5
CO	6.3
CO ₂	2.2
O ₂	0.3
N ₂	9.1
Total	100.0

PRODUCTION OF ILLUMINATING GAS FROM COKE OVENS.

works, with exceedingly good results in regard to heat efficiency—i. e., 90 per cent. of the fuel value of the coke charged into producers is accounted for in the increased

plant, a water gas plant may be added to the coke ovens, as is indicated in Fig. 5. This plant may be operated in three ways:

a. As a producer plant. By shutting valve 27 permanently and opening valve 25 the generator 26 is permanently used as a producer. A mixture of air and steam is blown through the incandescent fuel bed, and

diary carbureted water gas plant with generator 26, carburetor 28, superheater 29, washer 30, condensers 31 and 32 and relief holder 34. The carbureted water gas is sent through the exhauster 35 and through the puri-

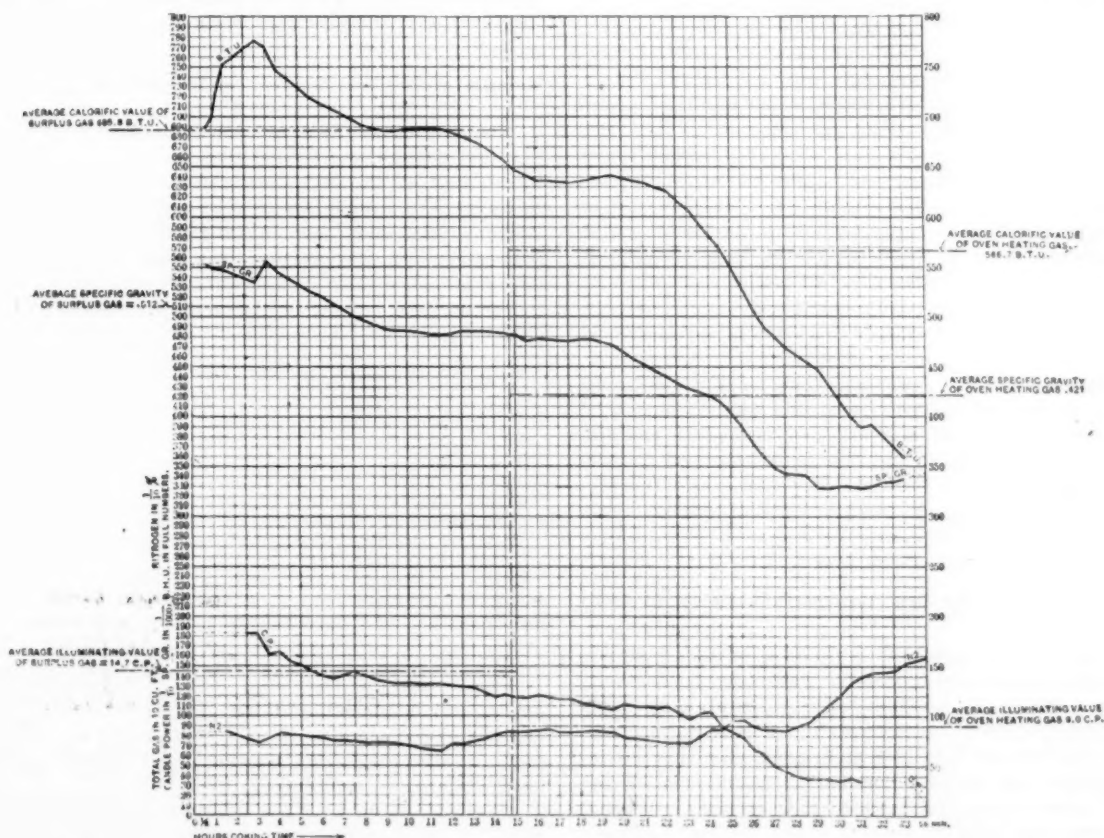


Fig. 7.—The Calorific Value, Specific Gravity and Candle Power of Dominion Coal Gas Produced in Coke Oven Test.

Surplus gas produced during first 14 hours 46 minutes:
Average calorific value.....655.8 B. H. U.
Average illuminating value.....14.7 C. P.
Average specific gravity.....0.512
Volume per long ton, 5,143 cubic feet =49.5 per cent.

Oven heating gas produced during remaining 19 hours 10 minutes:
Average calorific value.....566.7 B. H. U.
Average illuminating value.....9.0 C. P.
Average specific gravity.....0.421
Average per long ton, 5,247 cubic feet =50.5 per cent.

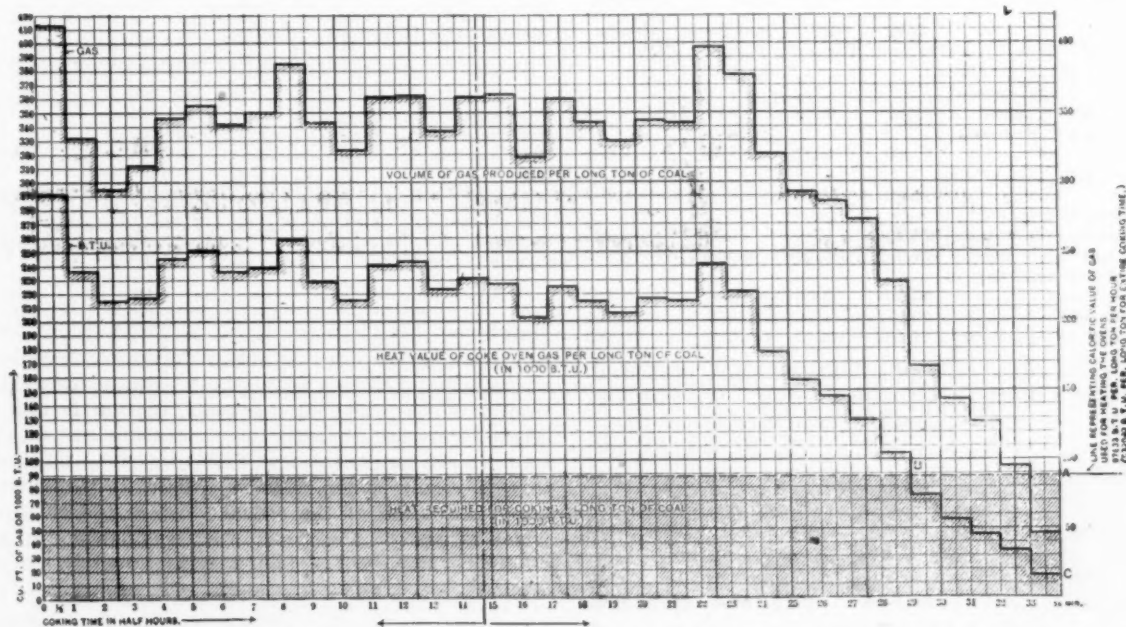


Fig. 8.—Volume and Total Calorific Value of Dominion Coal Gas Produced in Coke Oven Tests.

Surplus gas produced during first 14 hours 46 minutes:
Volume, 5,143 cubic feet =49.5 per cent. of total.
Calorific value, 3,527,320 B. H. U. =54.2 "

Surplus gas produced during remaining 19 hours 10 minutes:
Volume, 5,247 cubic feet =50.4 per cent. of total.
Calorific value, 2,973,680 B. H. U. =45.8 "

PRODUCTION OF ILLUMINATING GAS FROM COKE OVENS.

the gas, after being scrubbed in 40, passes through pipe 41 into the oven gas holder, where it mixes with the poor coke oven gas and is sent to the coke ovens for heating.

b. As a carbureted water gas plant. By shutting valve 25 and opening valve 27 the plant becomes an or-

ifying plant 37 into the large storage holder for illuminating gas. It is evident that such an equipment affords a most valuable reserve in case of coal shortage, strikes, &c.

c. Combined producer and water gas plant. When

blowing air through the generator, valve 25 is opened and the producer gas passes through scrubber 40 into the oven fuel gas holder 16. When the fuel bed thus becomes hot, valve 25 is closed and valve 27 is opened, while steam is blown through the generators. The resulting blue water gas passes through the entire set of water gas apparatus, 28 to 32, while, however, no oil is fed into the carburetor. The blue water gas is finally taken from the storage holder 34 by means of exhauster 35, and mixed with the rich gas coming through pipe 42 at the entrance of the purifying house 37. The mixture of the gas then passes into the storage holder and thence into the city. The candle-power in the rich gas would, of course, be reduced by the admixture of blue water gas, but this is made up by the benzol which is transferred from the poor gas to the rich gas, as described above. The admixture of water gas, with its percentage of hydrogen and carbon monoxide, to the rich coal gas has advantages which will be discussed later on.

Recovery of Tar and Ammonia.—The tar and gas liquor which are collected in the condensing plant are treated in the same manner as is generally practiced in gas and by-product coke works, and the description of the detailed arrangement of the ammonia house and tar separators may be omitted here. Whether concentrated ammoniacal liquor or sulphate of ammonia is to be produced depends on local conditions.

The Principles of the Dry Distillation of Coal in Coke Ovens.

Bituminous coal, when it is exposed in closed retorts to a high temperature, gives the following products: 1, Coke, remaining as a residue in the retort; 2, tar; 3, gas liquor, from which subsequently by distillation ammonia products are obtained, and, 4, coal gas, which contains benzol and its homologues in vapor form. From the gas there are at times additional products extracted—cyanogen and sulphur—but this will not be discussed here.

In order to show the variations in the yields of different coals, I will give the results obtained on some coals in Otto-Hoffmann coke ovens (Table V):

Table V. Yields of Various Coals Used in Otto-Hoffmann Ovens.

Plant used.	Coke. Per cent.	Tar. Per cent.	Sulphate. Per cent.	Total gas per 2,000 pounds. Cubic feet.
Average operating results:				
Dominion (Cape Breton) coal, Everett, Mass....	72.83	4.99	1.010	About 9,000
Youghiogheny (Pa.) coal, Glassport, Pa.....	75.60	5.07	1.100	" 9,000
Westphalian coal (Germany)	74.50	3.70	1.280	" 9,600
Distillation test:				
Connellsville (Pa.) coal..	76.34	6.14	1.223	" 8,924
Pittsburgh (Pa.) coal...	68.25	4.38	0.908	" 8,884
Coal from eastern part of				
Pennsylvania	85.00	2.00	0.800	" 8,400
Virginia coal.....	66.01	4.70	1.070	" 10,090
Kanawha (W. Va.) coal.	73.60	6.40	1.000	" 10,289

All these coals are true bituminous coals, geologically belonging to the carboniferous system. We have also investigated several lignites of the Cretaceous period, which give very different results. The above mentioned carboniferous coals show a very great variation. It is seen that the gas yields do not change in the inverse proportion of the coke yields. Thus, coals which yield about 72 to 76 per cent. of coke render a surplus of between 3000 and 4000 cubic feet of gas per net ton, from a total of 9000 to 9500 cubic feet. In the case of a higher coke yield (Eastern Pennsylvania coal renders 85 per cent. of coke) we obtain about the same amount of gas—i. e., 8000 to 9000 cubic feet. But this is of such a low heat value that all the gas is needed for heating the coke oven; thus there is no surplus. Hence the limit for operating coke ovens appears to be with coals yielding from 85 to 87 per cent. of coke.

Very good results are obtained with Virginia and West Virginia coals. Two thousand pounds of a certain Virginia coal yield 66 per cent. of coke and 10,090 cubic feet of gas of very satisfactory value. By separating the quantity of gas recovered into two fractions, rich and

poor gas, and using the former for illumination, while the latter is employed as fuel gas under the retorts, we are enabled to use other than gas coals. Connellsville, Youghiogheny or any other kind of ordinary coking coal furnishes a gas of 18 to 20 candle-power. Even slack coal gives a very high grade illuminating gas, but in this case the coke obtained has to be used for domestic purposes.

Results of Dry Distillation of Dominion (Nova Scotia) Coal.

The coal from the International Seam of the Dominion Coal Company, at Cape Breton, N. S., which is now being used by the New England Gas & Coke Company in their 400 Otto-Hoffmann coke ovens at Everett, near Boston, Mass., has been investigated in detail. The 400 Otto-Hoffmann coke ovens of the Dominion Iron & Steel Company at Sydney, Cape Breton, run on coals from the same field. We give the more important results in detail:

Table VI.—Summary of Results of Dominion Coal Test at Glassport, Pa.

Product of 1 long ton of coal.	Pounds.	Per cent.
Coke	1,593.4	71.18
Tar	75.7	3.38
Ammonia (= 1.373 per cent. sulphate).....	7.6	0.34
Gas, total 10,390 cubic feet, of 0.466 sp. gr. .	368.0	16.43
Sulphur compounds of gas:		
Hydrogen sulphide (H ₂ S), 0.98 pound per 1,000 cubic feet.....	10.8	0.48
Carbon disulphide (CS ₂), 0.13 pound per 1,000 cubic feet.....	1.6	0.07
Gas liquor and loss, by difference.....	182.9	8.17
Totals.....	2,240.0	100.00

These and the following results were obtained by averaging the determinations of four consecutive oven charges at the plant of the Pittsburgh Gas & Coke Company, at Glassport, Pa., whither the Dominion coal had been shipped in September, 1897.

The test plant was not completed before February, 1898. In the meantime the coal had been exposed to the weather.

Test Ovens.—The test oven was of the Otto-Hoffmann regenerative type, 33.5 feet long, 5 feet 10 inches high, and on an average 20.75 inches wide (19.5 and 22 inches). The coking time was on an average nearly 34 hours.

Coal and Coke.—The slack coal, when charged, contained 9.9 per cent. of moisture. The crucible tests showed the following results:

Table VII.—Crucible Tests of the Dominion Coal and Coke.

	Dry coal. Per cent.	Dry coke. Per cent.
Volatile matter.....	34.60	1.27
Fixed carbon.....	59.56	89.82
Ash	5.84	8.91
Totals.....	100.00	100.00
Sulphur, fixed.....	1.696	2.406
Sulphur, volatile.....	1.058	0.020
Totals.....	2.754	2.426
Phosphorus	0.0026	0.0041

The sulphur is considerably reduced in the coal used at Everett and Sydney by washing. Eliminating the ash from both coke and coal, it is found that of the coal substance enters into the coke: In the crucible test, 63.25 per cent.; in the large oven test, 68.81 per cent. This shows that the results of the ordinary crucible tests offer no reliable indication of the actual yield in the coke oven, which is easily understood when comparing the great difference between the coking in the crucible and coke oven.

Table VIII.—Ultimate Analyses of Dominion Coal and Coke.

	Coal. Per cent.	Coke. Per cent.
Carbon	75.10	86.42
Hydrogen	3.75	1.06
Nitrogen	1.51	0.73
Oxygen	11.05	0.46
Ash	5.84	8.91
Sulphur	2.75	2.42
Totals.....	100.00	100.00
Calorific value (Dulong-Mahler formula): Coal, 12,437; coke, 13,305.		

The coal substance (free of ash) contains 2.52 per cent. of disposable hydrogen. The specific gravity of the

dry coal was 1.28. When dried at 110 degrees C., cooled, weighed and afterward put under a glass bell, the coal absorbed from the moist atmosphere 4.01 per cent. of water at 16 degrees C.

The following table gives a comparison of the analysis of the Dominion coke ash with the ash from Connellsville (Pa.) beehive coke, Phelan coke (from another Cape Breton coal) and Pennsylvania anthracite:

Table IX.—Analyses of Ash.

	Connellsville coke, by E. Pechlin.	Inter- national coke.	Phelan coke.	Anthracite from Lehigh Coal & Navigation Com- pany's Panther Creek mine.	
				Red ash.	White ash.
Silica, SiO_2	57.48	27.71	26.65	47.19	48.25
Alumina, Al_2O_3	34.64	13.04	12.50	32.52	36.18
Oxide of iron, Fe_2O_3	5.09	50.60	46.45	4.71	3.29
Oxide of manganese, Mn_2O_3.....	.....	0.25	0.70	trace.	trace.
Lime, CaO	2.58	4.61	6.15	3.64	1.95
Magnesia, MgO	0.08	0.77	1.43	0.97	0.92
Potassium oxide, K_2O}.....	.....	0.85	0.64	7.31	7.25
Sodium oxide, Na_2O }	trace.	0.18	0.41	.....	.....
Sulphuric acid, SO_3 ....	.....	2.62	5.01	0.71	0.49
Phosphoric acid, P_2O_5	0.13	0.10	0.25	1.96	0.92
Titanic acid.....	.....	.....	.....	0.99	0.75
Totals.....	100.00	100.00	100.00	100.00	100.00

The washing of the coal will reduce the percentage of oxide of iron in the Dominion coke ash. The composition of the coke ash is of great importance, especially when the coke is to be used for domestic purposes. The more fluxible ash is liable to form undesirable clinkers. The actual coke yield at Everett is, on an average, 72.8 per cent., as against 71.13 per cent. in the test.

Tar.—The yield of tar in the test was 3.38 per cent., while the actual results obtained at Everett are on an average 4.99 per cent. The difference is possibly due to exposure of the test coal, as stated above.

Table X shows the result of the fractional distillation of the Dominion tar, as compared with other tars:

Table X.—Tar Distillation Products.

Fractions.	Temperature. Degrees C.	Otto-Hoffmann coke oven tar		Gas works tar.	
		Dominion coal test.	Dominion coal. Everett.	Dominion coal. Sydney.	Germania plant (Westphalia).
Light oil.....	80-170	3.7	1.26	1.38	6.55
Middle oil.....	170-230	9.8	14.73	11.46	10.54
Heavy oil.....	230-270	12.0	7.07	8.56	7.62
Anthracene oil.....	over 270	43.0	21.38	20.63	44.35
Pitch.....	.....	67.0	53.03	53.68	30.55
Water.....	.....	2.3	1.52	1.93	trace.
Loss.....	.....	0.9	1.01	1.38	0.39
Totals.....	.....	100.0	100.00	100.00	100.00
Fixed carbon, per cent. ....	.....	S p. c.	8-10 p. c.	5.35 p. c.	.....
Specific gravity.....	.....	1.170	1.188	1.14	1.1198

The low percentage of free carbon in coke oven tar, as compared with gas works tar, is a great advantage. Pitch also is of very much higher quality when produced from coke oven tars. The softening point of the Dominion test pitch is 87 degrees C.

Ammonia.—The total gas liquor produced was found, by difference, to be about 8.17 per cent. of the dry coal. The ammonia yield, calculated as sulphate, was found in the test as 1.373 per cent. As nitrogen in the coal is 1.51 per cent., it is found that 18.5 per cent. of the total nitrogen in the coal has been converted into ammonia, which is a very high figure. The actual yield of the operations at Everett has not produced such a high percentage of sulphate of ammonia. The yield is, on an average, only slightly above 1 per cent.

Gas from Dominion Coal.—The gas was analyzed frequently, and the results are shown in Table XII.

On the basis of these determinations, Table XIII has been computed, which shows the cumulative results for the average of the gas up to and including each hour. In order to more easily observe the changes in the quality of the gas analyzed, the results, as contained in this table, have been illustrated in a set of graphical charts—Figs. 6, 7 and 8. From these it will be seen that the

coking process may be divided into three distinct periods. During the first period the coal is heated up and a gas very rich indeed in marsh gas and hydrocarbons is obtained. During the second period the coking gradually progresses to the center of the charge, and a coal gas of almost constant quality is produced. At the beginning of the third period the heat has penetrated from both side walls of the retort to the center of the charge, and then the temperature increases rapidly. This results in the production of a gas very much richer in hydrogen. The coking time was 34 hours in the 20.75-inch oven.

If the process had been carried on in a narrower oven the same results would have been obtained in a shorter time. The sudden change which takes place in the character of the gas after the twenty-second hour is explained by the fact that the heat has at that time penetrated to the center of the coal charge. The amount of gas produced at that time decreases considerably. Unless proper provision is made, the pressure in the retort decreases, in consequence of which more air is liable to enter into the retort through cracks in the door luting. This is clearly shown in the graphical chart Fig. 6, where the nitrogen gradually increases after the twenty-second hour. If this nitrogen be eliminated from the analysis as an incidental impurity (see Table XII, second column), it would be found that the gas substance in the first hour shows 44 per cent. of marsh gas and 37.6 per cent. of hydrogen, while at the end it shows 11.9 per cent. of marsh gas and 80.7 per cent. of hydrogen.

As it will be possible to separate any fraction of the gas and concentrate the vaporous illuminants in the same, it is understood that a wide variation in the character of the coal gas flame can be produced at will. In these tables the candle power had been given, as observed in the gas not freed of carbonic acid, only the sulphureted hydrogen having been removed.

The graphical chart Fig. 8 shows the quantity of the gas produced during each hour, and also the total heat value of this gas. The quantity of gas burned un-

der the retort was carefully measured and its calorific value determined, so that we were able to ascertain the total heat value of the gas consumed. This is, of course, an almost constant amount for the entire coking test. It will be seen that at the twenty-ninth hour the amount of heat obtained in the coal gas becomes less than the amount of heat consumed by the oven. In other words, it takes more heat to drive out the last traces of volatile constituents from the coke than is produced in the gas. If metallurgical coke is required it is necessary to carry on the coking operation to the almost complete expulsion of volatile matter. If domestic coke is required this is not necessary, and the coking operation can be conveniently interrupted at the twenty-ninth hour—provided the block of coke is sufficiently solid to allow of its being pushed from the oven. In that way an additional amount of heat, represented by the spaces A, B, C on the graphical chart Fig. 8, is saved. Furthermore, the coking period is shortened from 34 to 29 hours—a considerable increase in the capacity of the plant.

Having ascertained the total amount of heat required by the oven, we deducted this amount from the total heat produced in the gas, and were able to indicate the

division line in the surplus and the coke oven heating gas, as shown in Table XIII. The coke oven is then operated so as to collect in one main the entire gas pro-

oven gas, according to the results obtained in the Glassport test, as contrasted with the present actual results, is very clearly shown in Tables XIV and XV:

Table XII.—Hourly Analyses of Dominion Coal Gas Produced in Coke Oven Test.

Hours after Charging.	ANALYSES OF GAS PRODUCED.							ANALYSES OF GAS FREE OF N ₂ AND O ₂ .					Specific Gravity of Gas from Sheet 18.	Calorific Value of Gas Produced.	Candle Power of Gas Not Freed of CO ₂ .	Gas Produced During Each Hour per Long Ton of Dry Coal, Cubic Feet.	Heat Value of Gas Produced During Each Hour per Long Ton of Dry Coal, B.H.U.	Illuminating Value of Gas Not Freed of CO ₂ Produced During Each Hour per Long Ton of Dry Coal, Candle Feet.
	Cm H ₂ .	CH ₄ .	H ₂ .	CO.	CO ₂ .	O ₂ .	N ₂ .	Cm H ₂ .	CH ₄ .	H ₂ .	CO.	CO ₂ .						
1	5.8	40.3	34.3	6.8	3.9	0.2	8.7	6.8	44.0	37.6	7.7	3.9	.552	707	18.4	413	292,000	7,599
2	5.8	41.2	33.6	6.7	3.8	0.3	8.6	6.7	44.6	37.2	7.5	4.0	.547	707	18.4	333	236,000	6,127
3	5.8	41.8	34.0	6.5	3.7	0.3	7.9	6.5	44.9	37.3	7.3	4.0	.539	736	18.4	295	217,000	5,428
4	5.7	41.5	34.1	6.3	4.2	0.4	7.8	6.5	45.4	37.1	6.7	4.3	.555	699	16.2	312	218,000	5,054
5	5.7	41.5	34.8	5.8	3.9	0.3	8.0	6.4	45.3	37.7	6.4	4.2	.539	709	15.4	347	246,000	5,344
6	5.4	40.7	36.1	5.7	3.7	0.4	8.0	6.2	44.4	39.2	6.3	3.9	.527	703	14.4	357	251,000	5,141
7	5.4	39.6	37.6	5.8	3.5	0.4	7.7	5.9	43.4	40.8	6.2	3.7	.515	693	13.8	342	237,000	4,720
8	5.2	38.8	39.0	5.7	3.4	0.3	7.6	5.7	42.4	42.2	6.1	3.6	.502	683	14.5	350	239,000	5,075
9	5.0	37.8	40.2	5.9	3.3	0.4	7.5	5.4	41.5	43.5	6.3	3.4	.492	671	13.7	386	259,000	5,288
10	4.9	37.4	41.2	5.9	3.2	0.3	7.1	5.3	40.6	44.3	6.4	3.4	.486	666	13.3	344	229,000	4,575
11	4.9	37.0	41.5	6.2	3.2	0.3	6.9	5.3	40.1	44.7	6.5	3.4	.484	667	13.2	324	216,000	4,277
12	4.8	36.5	42.0	6.3	3.3	0.3	6.8	5.2	39.4	45.3	6.6	3.5	.482	666	13.2	362	241,000	4,778
13	4.7	36.2	41.9	6.1	3.4	0.4	7.3	5.0	39.3	45.4	6.7	3.6	.485	672	13.0	363	244,000	4,719
14	4.5	35.7	41.9	6.2	3.5	0.3	7.9	4.7	39.2	45.7	6.7	3.7	.485	665	12.3	337	224,000	4,145
15	4.4	35.3	42.1	6.2	3.3	0.4	8.3	4.5	38.8	46.2	6.8	3.7	.483	638	12.1	362	231,000	4,380
16	4.1	34.9	42.4	6.3	3.3	0.4	8.6	4.3	38.6	46.6	7.0	3.5	.478	624	11.9	364	227,000	4,331
17	3.8	34.7	42.9	6.5	3.0	0.4	8.7	4.2	38.3	46.9	7.2	3.4	.478	642	11.9	318	204,000	3,784
18	3.7	34.7	42.9	6.6	3.2	0.4	8.5	3.9	38.3	47.0	7.3	3.5	.477	628	11.8	360	226,000	4,248
19	3.5	35.2	42.6	6.5	3.2	0.4	8.6	3.8	38.8	46.7	7.3	3.4	.478	623	11.1	345	215,000	3,829
20	3.4	35.1	42.7	6.5	3.0	0.4	8.4	3.6	39.3	46.6	7.3	3.2	.473	624	10.6	330	206,000	3,806
21	3.2	35.4	44.0	6.5	2.7	0.4	7.8	3.5	38.6	47.7	7.2	3.2	.458	624	11.0	346	216,000	3,715
22	3.1	34.8	45.4	6.3	2.5	0.4	7.5	3.2	37.9	49.2	6.9	2.8	.447	625	10.8	341	215,000	3,715
23	2.8	34.1	46.8	6.1	2.4	0.4	7.4	2.9	36.9	50.6	6.8	2.6	.434	608	10.3	396	241,000	4,079
24	2.5	32.3	48.7	5.9	2.2	0.4	8.0	2.6	35.2	53.1	6.6	2.5	.445	583	10.3	378	221,000	3,893
25	2.0	30.3	50.5	5.7	2.0	0.3	9.2	2.1	33.4	55.5	6.3	2.3	.415	556	9.0	320	178,000	2,880
26	1.5	26.8	54.5	5.5	1.8	0.3	9.6	1.8	29.6	60.3	6.2	2.1	.390	534	7.8	294	157,000	2,293
27	1.3	22.7	59.9	5.4	1.5	0.3	8.9	1.4	25.3	65.6	6.0	1.7	.361	510	6.3	286	146,000	1,802
28	1.0	19.2	64.0	5.4	1.3	0.3	8.8	1.2	20.8	70.4	5.9	1.6	.343	466	4.5	275	129,000	1,237
29	0.7	16.9	66.2	5.4	1.1	0.3	9.3	0.7	18.5	73.6	5.9	1.3	.341	456	3.8	228	104,000	866
30	0.6	15.2	66.4	5.6	0.8	0.2	11.2	0.6	17.0	75.0	6.2	1.2	.328	440	3.7	168	74,000	621
31	0.5	13.3	66.3	5.8	0.7	0.1	13.3	0.6	15.0	76.8	6.6	1.0	.330	389	3.8	144	56,000	547
32	0.4	12.0	66.2	6.3	0.8	0.1	14.2	0.6	14.0	78.1	6.5	0.8	.330	362	3.6	127	46,000	457
33	0.4	10.8	66.2	6.6	1.0	0.2	14.8	0.5	12.9	79.5	6.7	0.5	.335	362	3.5	94	34,000	329
34	0.2	9.6	66.7	6.4	1.3	0.2	15.6	0.4	11.9	80.7	6.5	0.5	.338	365(7)	2.5	46	26,000	115
Total.																10,390	6,501,000	122,981

Table XIII.—Analyses of Dominion Coal Gas Produced in Coke Oven Test, Showing Results Up to and Including Each Hour.

Number of Hours.	ANALYSES OF GAS PRODUCED.							ANALYSES OF GAS FREE OF N ₂ & O ₂ .					SPECIFIC GRAVITY OF GAS.		CALORIFIC VALUE OF GAS.		Candle Power of Gas not Freed of CO ₂ .	TOTAL QUANTITIES PRODUCED FOR LONG TON DRY COAL.			
	Cm H ₂ .	CH ₄ .	H ₂ .	CO.	CO ₂ .	O ₂ .	N ₂ .	Cm H ₂ .	CH ₄ .	H ₂ .	CO.	CO ₂ .	With. N ₂ & O ₂ .		With. N ₂ & O ₂ .			Gas Cubic Feet.	Calorific Value B. H. U.	Illuminating Value of Gas not freed of CO ₂ , Candle Feet.	
													With. N ₂ & O ₂ .	With. N ₂ & O ₂ .	With. N ₂ & O ₂ .	With. N ₂ & O ₂ .					
1	5.8	40.3	34.3	6.8	3.9	0.2	8.7	6.4	44.2	37.6	7.5	4.3	.552	.510	707	776	18.4	413	292,000	7,599	
2	5.8	40.7	34.0	6.8	3.8	0.2	8.7	6.4	44.6	37.3	7.5	4.3	.550	.508	709	778	18.4	746	528,000	13,726	
3	5.8	41.0	34.0	6.7	3.8	0.2	8.5	6.4	44.9	37.2	7.3	4.2	.547	.506	716	773	18.4	1,041	745,000	19,154	
4	5.8	41.1	34.1	6.6	3.9	0.3	8.2	6.3	44.9	37.3	7.2	4.3	.549	.509	712	778	17.9	1,353	963,000	24,203	
5	5.8	41.2	34.2	6.4	3.9	0.3	8.2	6.3	45.0	37.4	7.0	4.3	.547	.507	705	770	17.4	1,700	1,209,000	29,551	
6	5.7	41.1	34.5	6.3	3.9	0.3	8.2	6.2	44.9	37.7	6.9	4.3	.543	.503	709	775	16.8	2,057	1,460,000	34,693	
7	5.6	40.9	35.0	6.2	3.9	0.3	8.1	6.1	44.7	38.2	6.8	4.2	.540	.500	707	772	16.4	2,399	1,697,000	39,413	
8	5.6	40.6	35.4	6.2	3.8	0.3	8.1	6.1	44.3	38.6	6.8	4.2	.535	.495	704	769	16.2	2,749	1,936,000	44,488	
9	5.5	40.2	36.1	6.2	3.7	0.3	8.0	6.0	43.8	39.4	6.8	4.0	.529	.489	701	764	15.8	3,135	2,195,000	49,776	
10	5.5	39.8	36.6	6.1	3.7	0.3	8.0	6.0	43.4	39.9	6.7	4.0	.525	.483	697	760	15.6	3,479	2,424,000	54,351	
11	5.4	39.4	37.2	6.1	3.7	0.3	7.9	5.9	42.9	40.6	6.6	4.0	.521	.480	690	752	15.4	3,803	2,640,000	58,628	
12	5.4	39.3	37.5	6.1	3.7	0.3	7.7	5.9	42.7	40.8	6.6	4.0	.518	.478	692	752	15.2	4,165	2,881,000	63,406	
13	5.3	39.1	37.9	6.1	3.6	0.3	7.7	5.8	42.5	41.2	6.6	3.9	.516	.476	690	750	15.0	4,528	3,125,000	68,125	
14	5.3	38.8	38.2	6.1	3.6	0.3	7.7	5.8	42.2	41.5	6.6	3.9	.513	.473	688	748	14.8	4,865	3,349,000	72,270	
	5.2	38.7	38.4	6.1	3.6	0.3	7.7	5.7	42.0	41.8	6.6	3.9	.511	.472	685	744	14.7	5,143	3,537,320	75,628	
15	5.2	38.6	38.5	6.1	3.6	0.3	7.7	5.7	41.8	42.0	6.6	3.9	.511	.472	685	743	14.6	5,227	3,580,000	76,650	
16	5.1	38.4	38.7	6.2	3.5	0.3	7.8	5.6	41.8	42.1	6.7	3.8	.509	.468	680	740	14.4	5,591	3,807,000	80,981	
17	5.1	38.1	39.0	6.2	3.5	0.3	7.8	5.6	41.5	42.4	6.7	3.8	.507	.466	679	739	14.3	5,909	4,011,000	84,765	
18	4.8	37.9	39.4	6.2	3.5	0.3	7.9	5.2	41.3	43.0	6.7	3.8	.505	.464	676	736	14.2	6,269	4,237,000	89,013	
19	4.9	37.8	39.3	6.3	3.5	0.3	7.9	5.3	41.2	42.9	6.8	3.8	.504	.463	673	733	14.0	6,614	4,452,000	92,842	
20	4.8	37.7	39.6	6.2	3.5	0.3	7.9	5.2	41.1	43.1	6.8	3.8	.503	.461	671	731	13.9	6,944	4,658,000	96,340	
21	4.7	37.6	39.9	6.2	3.4	0.3	7.9	5.1	41.0	43.4	6.8	3.7	.501	.459	669	730	13.7	7,290	4,874,000	100,146	
22	4.7	37.4	40.1	6.2	3.4	0.3	7.9	5.1	40.8	43.6	6.8	3.7	.498	.456	657	727	13.6	7,634	5,082,000	103,861	
23	4.6	37.2	40.4	6.2	3.3	0.4	7.9	5.0	40.6	44.0	6.8	3.6	.495	.452	654	724	13.4	8,030	5,330,000	107,913	
24	4.5	37.0	40.7	6.2	3.3	0.4	7.9	4.9	40.4	44.3	6.8	3.6	.492	.449	650	720	13.3	8,408	5,551,000	111,833	
25	4.4	36.8	41.2	6.2	3.2	0.3	7.9	4.8	40.4	44.8	6.8	3.5	.490	.448	656	715	13.1	8,728	5,729,000	114,713	
26	4.3	36.5	41.5	6.2	3.2	0.3	8.0	4.7	39.8	45.2	6.8	3.5	.485	.442	652	711	12.9	9,022	5,886,000	117,006	
27	4.2	36.0	42.0	6.1	3.1	0.3	8.2	4.6	39.3	45.9	6.8	3.4	.482	.435	648	708	12.8	9,308	6,032,000	118,808	
28	4.1	35.6	42.7	6.1	3.1	0.3	8.1	4.5	38.8	46.6	6.7	3.4	.478	.433	643	702	12.5	9,583	6,161,000	120,045	
29	4.0	35.1	43.2	6.2	3.0	0.4	8.1	4.4	38.3	47.2	6.8	3.3	.475	.430	639	693	12.3	9,811	6,265,000	120,911	
30	4.0	34.8	43.6	6.2	3.0	0.3	8.1	4.4	38.0	47.6	6.8	3.3	.472	.427	635	693	12.2	9,979	6,339,000	121,533	
31	3.9	34.5	43.9	6.2	3.0	0.3	8.2	4.3	37.7	47.9	6.8	3.3	.470	.423	632	691	11.9	10,123	6,395,000	122,080	
32	3.9	34.2	44.2	6.2	2.9	0.3	8.3	4.3	37.4	48.3	6.8	3.2	.465	.422	628	687	11.9	10,250	6,441,000	122,537	
33	3.9	33.9	44.5	6.2	2.9	0.3	8.4	4.3	37.1	48.6	6.8	3.2	.467	.418	626	685	11.8	10,344	6,475,000	122,866	
34	3.8	33.9	44.5	6.2	2.9	0.3	8.4	4.2	37.1	48.7	6.8	3.2	.466	.417	625	685	11.8	10,390	6,501,000	123,081	
	3.4	29.2	50.5	6.8	2.2	0.3	9.1	2.7	32.2	55.7	7.0	2.4	.391	.363	567	655	9.0	5,247	2,973,680	47,553	

Table XV.—Present Actual Operating Results at Everett.

Per long ton, dry coal.	Volume.		Calorific power.	
	Cubic feet.	Per cent.	B. H. U.	Per cent.
Surplus gas.....	4,448	44.5	3,170,940	54.3
Gas used for heating ovens 5,560	55.5	2,884,000	45.7	
Total gas produced.....	10,080	100.0	6,054,940	100.0

The comparison of the results of the test with the present practical operation in regard to gas analysis, &c., are shown in Table XVI.

Table XVI.—Comparison of Rich and Poor Gas from Dominion Coal, Obtained During Glassport Test and in Present Operations at Everett.

	Rich gas (surplus).		Poor gas (oven heating gas).	
	Glassport test.	Everett.	Glassport test.	Everett.
Illuminants (CmHn)....	5.2	5.0	2.4	2.5
Marsh gas (CH ₄).....	38.7	37.4	29.2	29.2
Hydrogen (H ₂).....	38.4	44.3	50.5	51.8
Carbon monoxide (CO)...	6.1	6.2	6.3	5.0
Carbon dioxide (CO ₂)...	3.6	2.9	2.2	2.0
Oxygen (O ₂).....	0.3	0.1	0.3	0.4
Nitrogen (N ₂).....	7.7	4.1	9.1	9.1
	100.0	100.0	100.0	100.0
Calorific value B. H. U.	685.8	707.8	366.7	515.0
Candle power not freed of CO ₂	14.7	16.3	9.0	8.0
Candle power freed of CO ₂	17.4	18.5	10.6	9.5

The slight variations between test results and the practical operating results may be explained by the exposure of the test coal to the weather, as mentioned above. On the whole, it can be seen that, in all important points, the operating results approximate very closely the test results, and in the more important instances exceed them. In other words, the Everett plant is fulfilling in every respect the expectations.

Heat Balance.

If we trace the heat value of the coal to the various products of the dry distillation we obtain the following results:

Table XVII.—Distribution of Heat Units in Coal.

100 pounds of dry coal yield.	B. H. U. per pound.	Total calorific power. B. H. U.	Per cent. of calorific power of dry coal.
71.13 pounds of coke.....	12,645	899,456	72.3
3.38 pounds of tar.....	12,210	51,410	4.1
229 cubic feet of surplus gas	686	157,504	12.7
234 cubic feet of heating gas	567	132,835	10.7
Ammonia liquor, sulphur in purifier and loss.....	....	2,496	0.2
Totals = 100 pounds dry coal .....	....	1,243,700	100.0

From this table it will be seen that the carbonization of the coal is performed with an expenditure of 10.7 + 0.2 = 10.9 per cent. of the heat value of the coal. This is a very low heat consumption, but with the new oven, which has been described above, we shall be able to still further decrease this figure.

A comparison of the heat expenditure in this process, as compared with the dry distillation of the coal in gas retorts, is of great interest. Table XVIII gives this comparison:

Table XVIII.—Comparison of Heat Distribution in Products of Distillation from Otto-Hoffmann Ovens and Ordinary Gas Retorts.

Heat contained in 100 pounds of dry coal is distributed as follows:	German coal in gas retorts.*			Dominion coal in Otto-Hoffmann ovens.	
	1	2	3	4	5
In coke, salable.....	46.1	51.0	46.0	47.8	72.3
In coke used for heating retorts	10.1	14.0	10.0	11.4	...
In tar.....	5.5	5.8	6.9	6.1	4.1
In gas, salable.....	21.0	20.0	23.0	21.3	12.7
In gas for heating ovens. ....	...	...	...	...	10.7
In ammonia liquor, sulphur in purifiers and loss....	17.0	9.2	14.1	13.4	0.2
Totals.....	100.0	100.0	100.0	100.0	100.0
Heat used and lost in distillation process.....	27.1	23.2	24.1	24.8	10.9
Heat contained in products.	72.9	76.8	75.9	75.2	89.1
Totals.....	100.0	100.0	100.0	100.0	100.0

* The above data were taken from the following sources:
Col. 1.—W. von Oechelhaeuser, *Die Steinkohlen-Gasanstalten als Licht-Wärme-und Kraft Centralen*.
Col. 2.—Körting, *Journal für Gasbeleuchtung*, 1898, p. 660.
Col. 3.—Dr. E. Schilling, *Steinkohlenleuchtgas*, p. 159.

The following table shows the great difference in the composition of the diluents in the coke oven gas during different stages of its production, based upon Tables XII and XIII:

Table XXII.—Diluents in Coke Oven Gas.

	CH ₄	H ₂	CO.
Product of first hour.....	40.3	34.3	6.8
Product of last hour.....	9.6	66.7	6.4
Surplus gas, 5,143 cubic feet per long ton coal	38.7	38.3	6.1
Oven heating gas, 5,247 cubic feet per long ton coal	29.2	50.5	6.3
Blue water gas (about).....	1.0	40.0	51.0

The high percentage of marsh gas in the first gas is of especial interest.

Commercial Results of Coke Oven Gas Plants.

The rapid increase in the number of by-product coke ovens built in the United States is ample proof that from a commercial point of view they are a good investment. It is impossible to give an operating statement which will apply to all conditions, as the same will vary with every city. We shall, however, enumerate the items which will enter into the actual operating balance, and give sufficient indication to enable the results to be computed for any particular condition:

Table XXVII.—Operating Results of a Plant of 100 Coke Ovens and Gas Plant.

ANNUAL EXPENDITURE.	Net tons.
1. Coal.—I base this estimate on average coking coal. The plant carbonizes 800 net tons of coal per day, or per year.....	292,000
2. Wages, materials and maintenance.—All these operating expenses depend on the local scale of wages and cost of materials. The total may be estimated at 30 to 50 cents per net ton of coal carbonized, for which sum the coal is taken from a vessel or railroad car, the coke delivered on the cars and the tar is delivered in a storage tank. The gas liquor is manufactured into concentrated ammoniacal liquor or sulphate of ammonia, and the illuminating gas is delivered into the gas holder.	
3. Gas auxiliary expenses.—The increased demand of the winter months would be satisfied by means of a producer plant, which would consume of coke.....	6,363
4. General expenses.	
5. Interest and depreciation.—The cost of the plant depends greatly on the location.	
ANNUAL RECEIPTS.	
6. Coke (75 per cent.).—600 net tons per day are equal per year to.....	219,000
The value of the coke will depend upon the demand for the same. Metallurgical and foundry coke generally command a better price than domestic fuel.	
7. Tar (5 per cent.) is equal to.....	14,600
The same is worth at present in London \$3.52 to \$4.25. In the United States, \$5-\$7 per net ton.	
8. Ammonia (1 per cent.) calculated as sulphate. The same is quoted at present in Liverpool \$51.64. From the sales price, the cost of the sulphuric acid should, however, be deducted, when manufacturing sulphate. One pound of sulphate requires approximately 1 pound of 60 degrees (Beaumé) sulphuric acid. (New York, \$52-\$58 net ton.)	2,920
9. Additional by-products (cyanides, light hydrocarbons, sulphur) may be recovered. The market price for these products varies greatly.	
10. Gas.—The gas sold to consumers, after taking into consideration the leakage, &c., will amount per year to.....	1,250,000,000
The value of the gas in the holder varies according to local conditions within wide limits.	

I hope to have proved that the by-product coke oven will require serious consideration in the solution of the smoke problem. Apart from this, it commands attention on account of its extensive use in the blast furnace industry. Heretofore, the coke oven surplus gas has been used under boilers. By adopting the improvements described above gas of excellent quality can be obtained

and made available for the supply of large cities. Such a plant would form a central station to supply light, heat and power. Considering the three requirements, I find the following:

1. *Light.*—The gas is of high candle power, and at the same time of high calorific value; so that it can be used to advantage in an open flame or in the incandescent lamp. Wherever electric light for isolated plants is preferred, it could be very cheaply produced by gas engines.

2. *Heat.*—The high calorific value makes the rich coke oven gas the best artificial fuel gas for domestic and small manufacturing purposes. Wherever solid fuel is required coke can be used to better advantage than any other fuel. Its only disadvantage, as compared with anthracite and bituminous coal, is its greater bulk. The smoke and cinder problem would find a satisfactory solution. Tar may also be mentioned as a possible liquid fuel, to be used with advantage for special purposes.

3. *Power.*—For small units, the gas engine is destined to replace the steam engine. If the peculiar requirements of the case make electrical power preferable, the gas engine can produce the same most economically. For larger units, the coke could be gasified and larger gas engines employed. Wherever a change to the more economical gas engine is impossible and boilers cannot be replaced, coke can be used with great success as fuel.

A Notable Advance in Shipyard Practice.

There are now being installed at the shipyard of the Fore River Ship & Engine Company at Quincy, Mass., some appliances for the handling of material that mark a decided advance in anything in the way of shipyard equipment in either American or European yards, and which are so different from anything hitherto built that a description will prove of interest.

One of the constructions to which we refer is the crane service over the shipbuilding berths, Figs. 1 and 2. Heretofore it has been customary to handle material from the transporting trucks on which it arrives from the ship sheds or works to the ships, either by means of a system of derricks erected alongside of the build-

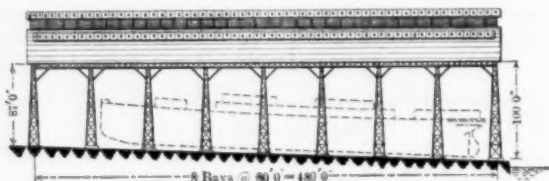


Fig. 2.—Side Elevation Fig. 1.

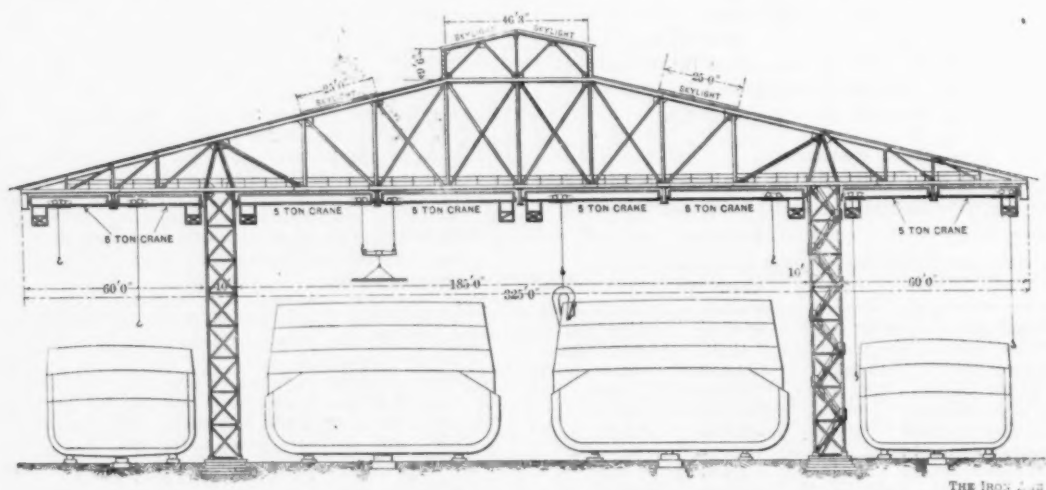


Fig. 1.—Crane Service Over Shipbuilding Berths.

A NOTABLE ADVANCE IN SHIPYARD PRACTICE.

All that has been stated is now corroborated by the results of plants in the United States, operated on the largest scale. When the first discussions on this subject were brought before the public they were received with a great deal of skepticism. The advocates of the by-product coke ovens were considered as people who travel into far away countries *avant d'être partis*. This industry has found a solid footing in the United States, and several colossal plants are under contemplation.

In closing, I deem it my duty to gratefully acknowledge the munificence of the United Coke & Gas Company and the New England Gas & Coke Company, the presidents of which companies have made these investigations possible by their financial aid.

All engineers interested in this subject are cordially invited to visit any of the plants erected in the United States and Canada.

At the Mahoning Valley Works of the Republic Iron & Steel Company, Youngstown, the following output of rounds, square and flats of various sizes was made in the month of October by T. J. Malloy, roller on the 16-inch mill: First half of the month—24 turns, total weight, 2,589,140 pounds, an average of 107,880 pounds per turn; second half of the month—26 turns, total weight, 2,966,995 pounds, an average of 114,115 pounds per turn. These figures show the output of finished product shipped.

ing berths or by means of a cantilever or some other type of crane which spans the berths. The usual type of crane service for building berths has generally been a cantilever crane mounted upon an elevated track which is placed between two berths, thereby allowing the crane to command two ships. When this construction was first adopted it marked a great advance over anything previously attempted. There are, however, several disadvantages to this type of construction. First may be mentioned the impossibility of handling more than one plate on one ship at a time, and should it be necessary, as it frequently is, to be plating both ships at one time, only one plate can be brought out and put in position and held there while being secured, and as it often happens that several plates are required simultaneously when two ships are under construction, the riveting gangs have to wait until they can be served, and this means the loss of time of the men, and a corresponding delay in the completion of the ships. Another disadvantage is the large amount of weight which it is required to move in order to transport one plate. Owing to the length of span necessary in order to make the crane long enough to command two ships, its weight is necessarily very great, and it is unreasonable to move a crane weighing, say, 75 tons to transport a plate weighing 2 or 3 tons. The liability of the crane getting out of order is also always present, and when the crane is disabled, then all the handling of the plates,

frames, &c., on the two ships has to be suspended until the crane is repaired.

The crane service which the Fore River Company are now installing, and which was designed for them by the Wellman-Seaver Engineering Company of Cleveland, is laid out on an entirely different principle.

As shown in the accompanying illustration, Fig. 1, it consists in erecting over the building berths a great steel framed structure, the general outline of which is a truss roof with projecting wings on each side, the central span being wide enough to accommodate two great battle ships, and each wing wide enough to take in a large merchant ship. To the under side of the roof trusses of the frame are secured longitudinal lines of girders. These girders form tracks, upon each of

other purposes which will readily occur to an experienced shipbuilder.

The general design of the frame work is such that the central portion can be erected independently of the cantilever side extensions; these can be added at any future time. The frame work can also be furnished with a covering or roof, thereby protecting the ships and men from the weather.

Folding Jib Gantry Crane.

The second construction, and one that presents even more radically new features in shipyard work than the crane service over the building berths, is shown in the illustrations of the 75-ton folding jib gantry crane, which is being provided for the fitting out wharf of the com-

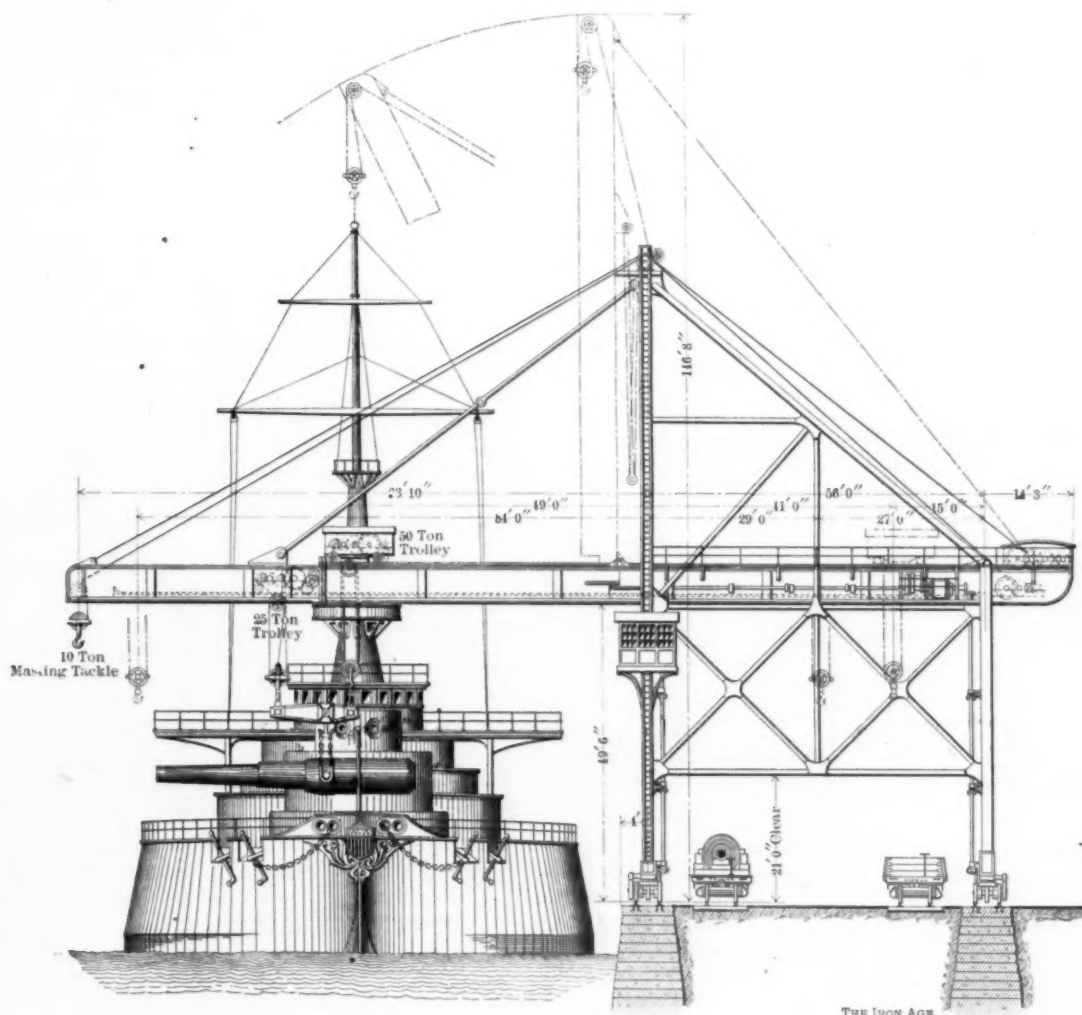


Fig. 3.—Folding Jib Gantry Crane.

A NOTABLE ADVANCE IN SHIPYARD PRACTICE.

which traverses an electric crane of 5 tons capacity. There are two of these cranes over each building berth, and the general arrangement is such that four ships can be under construction simultaneously, and each ship served by two independent cranes. These cranes, being designed for exceptionally high speed service, the material can be handled with the greatest rapidity and the least possible loss of time. When it is desired to transport heavier loads than the nominal capacity of each crane—namely, 5 tons—the lifting tackles of two of the cranes can be coupled together to a lifting beam, as shown, and then loads of 10 tons can be transported. This point is of great value in the laying of the keels of the ships and similar work. The cranes also, being of light construction and high speed design, can be utilized for suspending the riveting machines and other tools, also for placing in position the false work or gangways along the sides of the ships and numerous

pany. This crane was also designed, constructed and installed by the Wellman-Seaver Engineering Company and is believed to be the most powerful gantry crane ever constructed. The crane consists of two massive box girders, resting upon and supported by two A-frames, the outer or main A-frame being carried up to form a tower. The box girders are hinged at a point just in front of the main A-frame, the hinged portion being supported by means of eye bars and lifting tackles. On top of the box girders traverses a lifting trolley of 50 tons capacity, and between the girders there is provided an auxiliary trolley of 25 tons capacity, while at the extreme end of the jib or hinged girders there is an auxiliary tackle of 10 tons capacity. The general construction is such that the crane may be traversed up and down the wharf, and a load lifted from the tracks beneath the crane, traversed through the fore legs of the crane, and laid down on a ship lying alongside.

For lifting heavy loads the 25 and 50 ton trolleys can be coupled to an equalizing beam and worked in unison, as shown in Fig. 6. When this is done 75 tons can be handled safely.

For putting masts, Fig. 8, funnels and similar con-

shear legs in general use and the great fitting out cranes of Europe, which are invariably stationary with a revolving jib, the advantages of this type of construction are readily seen.

An Electric Stock Gauge for Furnaces.

An electric gauge for recording the height of the contents of furnaces, or for recording the time when the stock or contents reach a certain height, has recently been patented by Thomas Martin of Cleveland and is controlled by F. L. Grammer, Pueblo, Col.

The Bristol and Edson recorders now give us charts showing readings for each minute of the day of the water, steam, vacuum and blast, and if desired the gas pressure. The Steinbart recorders exhibit the Uehling readings of blast and gas temperatures continuously. The composimeter shows the gas analysis to those desiring it. The counters and indicators on the engines and pumps testify to the condition of the air and water supply, as regards quantity and regularity of supply. The weighman testifies to the regularity of the ore ratio, the chemist to the regularity or control of mixture and elements, and the top filler and weighman to the regularity of the feeding and working of the furnace. This device is an additional means of insuring such regularity.

In many cases the men will work hard for an hour and fill the furnace and then rest for an hour or less; getting a "hump" on the furnace is the way they designate it. It would be better if it were fed regularly and more slowly, and it is therefore desirable that the conditions shall be known. A gauge independent of the top filler or scaleman is an advantage at any furnace. At a group of furnaces where all indications can be recorded in a central office continuously the advantages are more pronounced, and on furnaces with mechanical charging tops a top gauger on each turn can be dispensed with. Thus such a device secures labor economy

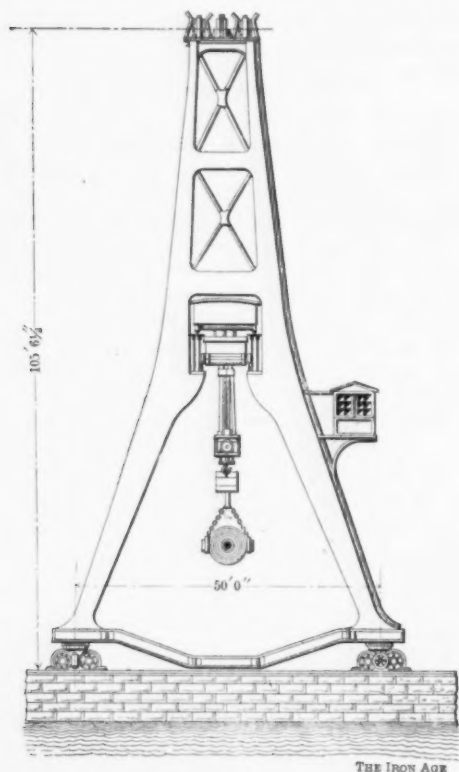


Fig. 4.—Side View Fig. 3.

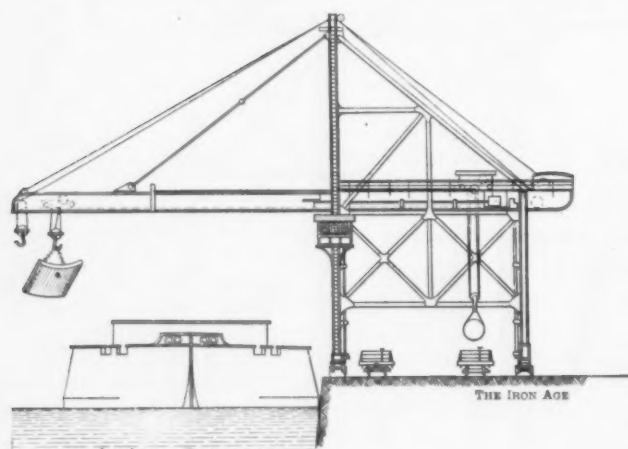


Fig. 5.—Elevation Showing 25-Ton Trolley in Maximum Position.

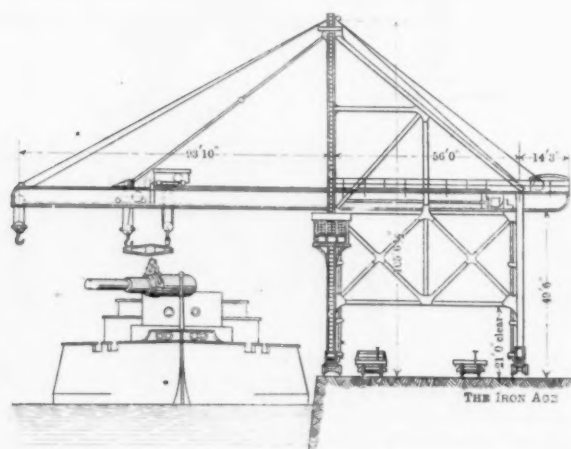


Fig. 6.—Elevation Showing 25 and 50 Ton Trolleys Lifting Together.

A NOTABLE ADVANCE IN SHIPYARD PRACTICE.

structions aboard a ship the lifting tackle at the end of the girders is used, and when it is desired to traverse the crane up and down the wharf with ships lying alongside, Fig. 7, the projecting girders are triced up into a vertical position by means of the back tackles.

All of the various motions of the crane are effected by means of powerful electric motors, connected by steel and bronze gearing to the various mechanisms, and all the motions are under the control of one operator, who is located in a cab attached to the fore leg.

The advantages that this crane possesses are very great, as it does away entirely with the warping of the ship into position, it only being necessary to lay up the vessel alongside the wharf, when any desired object can be lifted up and placed aboard the ship. When the motions of the crane are compared with the ordinary

in top gaugers and safety to life, for few furnaces cannot record one or more top fillers overcome by gas; closer metallurgical indices and better supervision over the stock yard boss and consequently greater probability of regular iron.

The device consists of two jar batteries, wires, electrodes, annunciators and insulators. One wire is attached to the nearest column or permanent fixture of the furnace proper. The other wire is attached to the electrode, an inch iron rod of a length equal to the depth of the stock line from the top platform plus 1 foot. They are carried in insulators through the masonry and iron work at the top. The wire going to the top should be run up under or behind some beam, protected so that the flying particles of coke, ore or limestone from slips will not sever it and destroy the circuit.

When the stock comes up and touches the electrode the circuit is completed and the annunciator registers the furnace as being full at that point. By having four, six or eight points, annunciators and circuits on each furnace, not only is the regularity of filling recorded, but evenness of distribution is exhibited. As limestone is a poor conductor an error in height equal to the thickness of the limestone layer is possible. By having the rods or electrodes of different length, the device can be used to indicate the successive heights of stocks, if that is deemed of more importance than distribution in some instances or processes.

In recording the heights of molten baths a water cooled pipe electrode can be used, putting on the very end a platinum point, the simple iron rod as an electrode being hardly adequate in conditions of over 700 or 800 degrees F.

The device using the current of the plant does not give such satisfactory results as by using the battery current, though both have been used, the former at the

pounds of brass. The order is for over 90,000 car journals.

The Lebanon Valley Furnace at Lebanon was blown out for repairs on Friday. All of the furnaces in the Lebanon region were in blast in October.

The Billmyer & Small Car Works at York will add a new department to their works for the manufacture of divided car axles. Several valuable patents for these axles have been secured and it is said that the firm may add a wheel department to their works.

Officials of the Pennsylvania Steel Company say that no steel car plant is to be built at Steelton. The Cambria Steel Company will enlarge that department of their works at Johnstown.

The October payroll of the Pennsylvania Steel Company contained 7305 names, the highest ever recorded at Steelton.

The York Bridge Company will build three bridges near York. Work on the main erecting shed will be started soon and a boiler house will also be erected. The

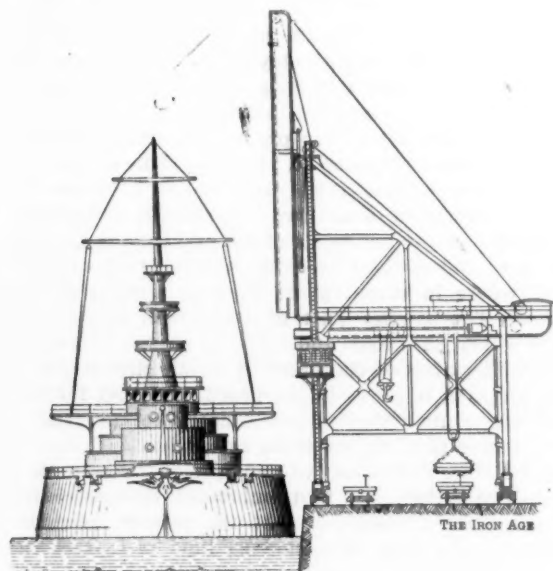


Fig. 7.—Showing Crane Traversing Wharf.

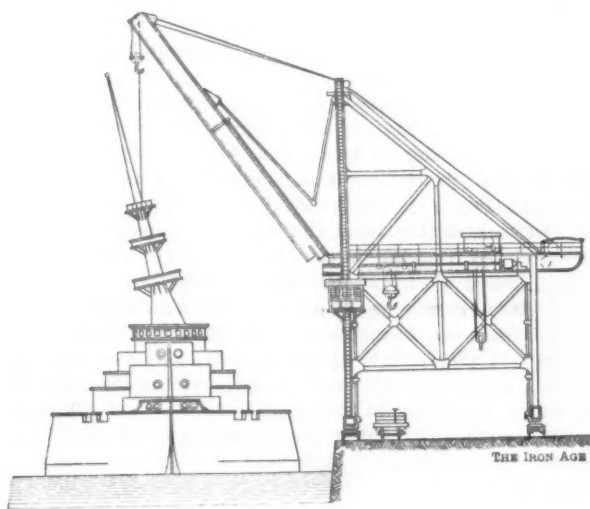


Fig. 8.—Jib in Position for Raising Mast.

A NOTABLE ADVANCE IN SHIPYARD PRACTICE.

Broadway Furnace, Cleveland, Ohio, and the latter for three weeks at the Minnequa Furnace A of the Colorado Fuel & Iron Company, Pueblo, Col.

Central Pennsylvania News.

HARRISBURG, PA., November 25, 1901.—The iron and steel works of Central Pennsylvania, especially the furnaces and puddle mills, are feeling the effects of the car shortage and furnace managers have had to hustle to keep up their supplies of coke. So far none of the stacks in this part of the State have had to suspend operations because of the scarcity of coke, but unless there is an improvement there will be trouble when winter sets in. Puddle mills and other establishments have experienced trouble in getting their products moved promptly.

Officials of the Susquehanna Iron & Steel Company have declined to make any statement relative to the proposed incorporation of that company with the new steel combination, concerning which much has been printed of late. The company have mills at Columbia and nearby places and two blast furnaces.

The Milton Car Works can scarcely keep pace with orders. Land near the works has been taken for storage of material.

The Fowler Radiator Company have secured land from the Lorain Steel Company for their plant at Johnstown. Portions of the old plant may be used.

A recent order from the Pennsylvania Railroad Company for their shops at Altoona will require 2,000,000

company's incorporators are G. W. and C. J. Drury, Grey and N. P. Webster, York, and George Lehner of Pittsburgh.

The tap and dye works at Millersburg, Dauphin County, will be enlarged. The fifth wheel works at the same town are increasing their capacity.

It is said that the work of construction of the Susquehanna Iron & Steel Company's pipe mill will be commenced in December. There will be three buildings built at Columbia, the two pipe mills being 90 x 450 feet. Over 60,000 square feet will be required and the old buildings are now being torn down.

At the annual meeting the West End Rolling Mill Company of Lebanon decided to build three new furnaces and a new office building. Contracts for two boilers were given. A 3 per cent. semiannual dividend was declared and C. Shenk elected president and H. M. Capp general manager.

S.

United States Consul Bergh, at Gothenburg, reports to the State Department that the Vislanda-Bolmen Railroad of Sweden recently made an experiment with pressed and dried peat as fuel with an extra train consisting of locomotive, 15 loaded freight cars and one passenger car. The distance was about 22 miles, and the time table was set for lower speed than the ordinary, but this extra train arrived in due time at the respective stations, and at the final station 15 minutes ahead of time. Considering the fact that the locomotive in use was built for using coal only, the result of the trial is regarded as very satisfactory.

The Mining Engineers in Mexico.

The members of the American Institute of Mining Engineers reached the City of Mexico toward the evening of Saturday, November 9, in time to participate in the formal inaugural session in the Salon de Actos of the Engineering School, being received by the Minister of Fomento, Leandro Fernandez, and representatives of the Academy of Sciences and by the Engineers' and Architects' Society of Mexico. The speech of welcome was delivered by Don Agustin Aragon, the orchestra of the National Conservatory of Music of Mexico furnishing selections.

The Engineers' School, formerly the School of Mines, is the most ancient of technical educational institutions in America. The initiative was taken by Don Joaquin Velazquez Cardenas y Leon, the first classes being opened in 1792. In 1813 the present great building was completed. The central vestibule gives access to a magnificent open *patio* or court, surrounded by arches, four minor courts furnishing light and ventilation to the other departments. The central part of the structure alone is occupied by the National School of Engineers, which is very well equipped. In the main entrance and in front of the principal stairway are the three famous Mexican meteorites.

Many of the engineers and their ladies spent Sunday morning in participating in the promenade in the Alameda square, where a large band plays between 11 and 1 o'clock, while the afternoon was given to the drive along the Paseo de la Reforma, a magnificent 200-foot driveway extending from the city to the gates of Chapultepec. At regular intervals the Paseo widens into circles, called *glorietas*, 400 feet in diameter. There are six of these, which are to be adorned with monuments. Two of them, to Columbus and to Cuauhtemoc, the last emperor of the Aztecs, are completed, while a third, to Juarez, is in course of construction. At the entrance of the Paseo is an heroic statue of Charles IV of Spain, a bronze casting weighing 60,000 pounds, which, it is claimed, is the largest in America.

On Monday morning began

The First Technical Session

In the Salon de Actos of the Engineers' School, the first paper, read in Spanish, being an admirable "Historical Sketch of Mining Legislation in Mexico," by Eduardo Martinez Baca. Since it is generally admitted by those who are entitled to speak with authority that the Mexican mining laws are far superior to those of our own country and are the closest to perfection, the paper possesses exceptional interest. Dr. James Douglas, who represents the extensive interests of Phelps, Dodge & Co. on both sides of the line, expressed himself most emphatically on this point. The Government does not, as we do, part with the mineral right on public lands, but leases it to the discoverer for a royalty which flows into the national treasury. The mineral is not the property of the owner of the surface, but may be claimed by any one by right of discovery, due sums being paid to the owner for any damage inflicted. There is nothing like our system of extra territorial rights, based upon the possession of the apex of a mineral lode, so fruitful a source of litigation. The mineral rights are bounded by the surface limits of the claim, the result being that litigation, so far as rights conveyed under the mining laws of Mexico are concerned, is practically unknown.

Mexican Mining Interests.

The possession of a law so just to the producing interests, while yielding adequate revenue to the National and State treasuries, is a very important factor in the development of the mineral resources, in which foreign capital is more and more extensively participating. Formerly English, French and German capital was largely relied upon. But since English mining interests have turned almost entirely to the Cape, to Australia and to other English colonies the Mexicans are looking with growing confidence to the United States. How largely Mexico is devoted to mining is shown by the fact that out of a total of exports in 1900 of \$134,900,173 not less

than \$79,779,467 were minerals and metal products. According to the census of 1900 there were engaged in mining 106,536 persons, of whom 99,396 were men, and in the mills and smelters 29,192, of whom 27,777 were men, these, of course, not including other occupations directly or indirectly dependent upon the mines.

Baca states that the production of Mexico from 1492 to 1881 of silver and gold was \$4,553,859,113, or an average of \$11,828,205, Mexican. For subsequent periods it was:

	Total.	Yearly average.
1881-1885, silver.....	\$157,827,478	\$31,565,495
1886-1900, silver.....	199,208,204	39,841,640
1892-1896, silver.....	225,247,495	56,311,864
1892-1896, gold.....	13,313,148	3,328,289

The production during the last five fiscal years was as follows:

Fiscal years.	Value of silver.	Value of gold.	Total.
1896-1897.....	\$63,342,455	\$7,218,836	\$70,561,291
1897-1898.....	70,923,024	7,726,006	78,649,030
1898-1899.....	69,547,708	8,339,892	77,887,600
1899-1900.....	72,115,508	8,505,787	80,621,295
1900-1901.....	74,245,908	10,056,351	84,302,259

The growth in the increase in the production of gold is noticeable, but it is probably much exceeded by the very rapid development in copper and lead, for which, unfortunately, no production statistics exist. This is a deplorable fact, which the proper Mexican authorities should give some attention to. However, the export statistics of Mexico shed much light on it, since the domestic consumption of the two base metals from Mexican sources of production is slight. A very large part of the ores and of the metals exported go to the United States, where in recent years they have been closely watched. The greater part of these ores and metals contain silver and gold, and there is reason to believe that the quantities of the precious metals thus exported are larger than is generally supposed, and that for this reason the contribution of the country to the world's store is larger than the statistics reveal.

Baca divides the history of mining legislation in Mexico into five periods, the first embracing that preceding the conquest. It appears that the Aztecs were not familiar with mining, not knowing how to extract the metals. Their operations were limited, therefore, to native gold and silver. Frequent changes were made in the mining laws during the domination of the Spaniards, whose first acts date back to 1519. After the consummation of the independence of Mexico in 1821 a series of laws were passed, which were codified in 1884, and in 1887 a general act was promulgated, followed in 1892 by the one now in force.

According to this law the miner may acquire any number of claims, whether continuous or disconnected, each claim being 100 m. square. He has full liberty to work them in any manner which he may select. He may slacken work or suspend it entirely, so that there is none of that very elastic requirement of a specified amount of annual work which we demand of an unpatented claim. He is, however, responsible for any accidents or damages. He loses possession only when he fails to pay the taxes due to the Government. These are \$10 stamp duty for each claim on the title papers and \$10 annually for each claim containing gold, silver or platinum, with certain modifications, and \$2.50 stamp duty and annual tax for each claim for other metals and minerals.

The second paper, also in Spanish, was that of José G. Aguilera, on "The Geographical and Geological Distribution of the Mines of the Republic of Mexico." It is a sketch of the geographical location of the mining districts in general, followed by a review of the localities in which the different metals and minerals are found, and concluding with a geological survey.

Both of these papers were prepared under instructions from the Ministry and were read by Don Ezequiel Ordonez.

After the session the engineers visited the Engineers' School, the National Library and the famous cathedral. In the afternoon special electric cars were at the disposal of the party for a trip to a number of the charming suburbs of the city, one of the particularly interest-

ing points visited being the house of Cortez at Coyoacan, which, partly restored, is now the headquarters of the municipality of that village.

In the evening a reception was tendered to the visitors by the municipality of the city in the Municipal Palace, in which there are many interesting historical portraits and pictures.

The Second Technical Session

was held on Tuesday morning, the first paper being that of Don Luis Zalazar, on "Mexican Railroads and the Mining Industry." It is an admirable historical review of the railroad development of Mexico, for which great monetary sacrifices were made, the concessions being carried out in the most liberal spirit. It is one of the great accomplishments of President Porfirio Diaz that, overcoming almost insuperable obstacles, he carried the railroad mileage from about 400 miles in 1877 to 9600 miles in September, 1901. There were paid out in subsidies up to December 31, 1899, \$30,145,517 in cash, \$28,909,314.53 in "certificates of railroad construction" and \$42,601,546.62 in bonds.

James Douglas, ex-president of the institute, then presented a paper on the "Use of Gas Engines in Mining." With the aid of a map he described the now well-known copper deposit of Nacosari, in Sonora, developed and operated by Phelps, Dodge & Co. of New York. The deposit is a hill of brecciated rhyolite cemented with pyrite, a cone of mineral whose character is very favorable to concentration. Accordingly two units of plant, having a capacity of 400 tons per day per unit, have been erected. The crude ore, which can now be treated economically, runs about 5 per cent., which is concentrated to 20 per cent., of copper. This is smelted at works located 5 miles distant on the Nacosari River, the matte being hauled over 90 miles of wagon road. A railroad to Nacosari is under construction.

One of the drawbacks of the district is the absence of good fuel, and every effort was bent toward reducing the fuel cost. It was decided to turn to gas fuel, and the possession of wood led to its substitution for coal. Aided by Swedish experience, it was decided to introduce the Loomis down current water gas producer. This was soon modified, so that water gas and producer gas are produced together by introducing steam into the producer continuously and making a mixed gas continuously. When the gas is too highly incandescent steam alone is introduced. The wood costs locally \$3, as against \$25 per ton for coal, and the wood gas is better in many respects. Typical analyses show 20 per cent. of carbonic oxide for coal, as compared with 14 per cent. for wood; 14 per cent. of hydrogen for coal, as compared with 20 per cent. for wood; 8.2 and 16 per cent., respectively, for carbonic acid, and 55 and 47.7 per cent., respectively, for nitrogen. No trouble whatever is experienced with tar.

The power plant consists of eight Otto gas engines, of 125 horse-power each, with 18½-inch cylinders and 24-inch stroke, running at 200 revolutions, coupled direct. In the smelting and concentrating plants there are 40 motors, ranging from 5 to 100 horse-power. With wet wood the consumption is 3 pounds of wood per horse-power per hour. Less steam is used in the producers when using wet wood.

The concentrates, which are briquetted, are smelted to a matte carrying 38 to 40 per cent. of copper, and are converted into black copper. Low grade silver and gold ores are used for lining the converters.

The application for membership of Manuel Maria Contreras, a distinguished Mexican mining engineer and long connected with the School of Mines, was acted upon by waiving the rules, the election being made unanimous. Mr. Contreras acknowledged the election in a happy speech.

After adjournment the party was conducted to the National Museum, in which the principal attraction was the famous Gallery of Monoliths, with the famous Aztec calendar stone, the Toltec column, the great sacrificial stone, the Chac-Mool, the Palenque cross and numerous other objects. There is also a very interesting collection of articles connected with the history of Mexico.

In the afternoon the institute was received by President Porfirio Diaz in the beautiful castle of Chapultepec, built by the Viceroy Bernardo de Galvez and completed by the Emperor Maximilian. It is located on a high rock in a beautiful park, once a forest of giant cypress trees, of which many still remain. The view from the castle balconies is exceedingly beautiful, the entire valley of Mexico lying at its feet, fringed by the mountain chains and the giant, snow capped mountains, Popocatepetl and Ixtaccihuatl. Porfirio Diaz, although a man over 70 years of age, is still very vigorous. Probably there is no chief of state, aside from the Emperor of Austria, on whose life the fortunes of his country hang as much as they do on this man's. It is the thought uppermost in the minds of all who contemplate Mexico's history during the past 25 years and its opportunities for future development, to whose hands the destinies of the country will be entrusted. He has been a firm and wise ruler, a despot who has accomplished wonderful results, but, after all, a despot. The thought is natural that Mexico may become the theatre for the struggles of rival politicians and suffer the check which unsettled conditions impose. Those handling and guarding large foreign interests in Mexico profess to see no danger of this character in the future. They argue that the country has too long enjoyed the blessings of internal peace to permit any political rivalries to disturb it. They insist that the vested moneyed interests are so large and so powerful that they can and will crush disorder.

After viewing the monument to the cadets of the military school who fell in the defense of Chapultepec the party were conveyed by electric cars to the famous shrine of Guadalupe, where the cathedral was specially decorated with flowers and the famous crown was exhibited to the visitors.

In the evening the engineers and their ladies were the guests of the American Club of Mexico, a prosperous institution, which is the rallying point for the large American colony. The statement is made that there are now about 6000 American residents in the City of Mexico, actively engaged in promoting the trade relations between the two republics. The most conspicuous interests represented are, naturally, the manufacturers of mining, agricultural and general machinery, the sale of which has grown enormously during the past decade. A large share of it is handled by merchants, while considerable business is also done by accredited agents.

The party was also invited to inspect the sampling and testing works of Heckelmann & McCann, the only plant of its kind in Mexico where working tests for concentration and the metallurgical treatment of ores can be carried through.

In the evening the engineers were entertained by the banking and commercial interests of Mexico at a concert and supper in the gardens of Chapultepec.

On Wednesday the greater part of the party accepted the invitation of the management of the Mexico, Cuernavaca & Pacific Railroad to make a visit in a special train to the Cuernavaca, in the State of Guerrero. The road is one of the famous scenic lines of Mexico. After crossing the valley of Mexico it ascends the mountain side, crossing for a long distance the lava beds, until an altitude of 10,400 feet is reached. Then the line drops rapidly 5000 feet into the beautiful, rich valley of the Morelos, with Cuernavaca in the center. The great snow capped peaks of Popocatepetl and Ixtaccihuatl are almost continuously in sight. The town is in the tropical zone, and the party then descended in a run of 75 miles from the temperate climate of the plateau to the tropical plain, with its great sugar plantations, its coffee trees and its luxuriant vegetation. The chief attraction were the Borda gardens, commenced in the middle of the last century by a French miner. Although showing in its fountains and terraces the effects of long neglect, the gardens are wonderfully attractive through their tropical vegetation. Cortez had a palace at Cuernavaca, which, with the plaza and market place, are very charming and interesting.

The Mexico, Cuernavaca & Pacific road is now completed to the Balsas River, the line passing through the

Igualo Cañon. It is to reach the Pacific at Zihuatanejo by following the course of the Balsas River. It will open the dormant mineral resources of the State of Guerrero and the agricultural section of the State of Morelos.

At midnight the party bid farewell to the hospitable City of Mexico, resuming their journey. Early in the morning they reached the famous old mining town of Pachuca, being roused from their slumbers by the strains of a large military band.

Pachuca.

The mining district of Pachuca is one of great age, the discovery dating back to 1522, scarcely two years after the conquest of Mexico had been consummated by Hernando Cortez. It has been famous for its bonanzas, among which was that of the San Rafael, which produced \$14,000,000 in ten years; the Rosario, which from 1853 to 1883 produced \$28,000,000; the Encino, which in the eighteenth century yielded \$6,000,000; the Santa Gertrudis, discovered in 1879, which has produced \$25,000,000 to date, and the Barron, which has raised \$6,000,000 since 1890. It is estimated that the district has during its existence turned out over 100,000,000 ounces of silver. The district embraces a territory 25 miles long by 12 miles wide, and includes the camps of Pachuca, Real del Monte, El Chico, Capula, Santa Rosa, Tepenene and others, the most important being the first three. There are four groups of fissure veins, called the Vizcaina, El Cristo, San Juan Analco and Santa Gertrudis. They are usually small, going rarely above 22 feet, but are very persistent over long distances, the Vizcaina extending for over 10 miles. The upper zone in the veins, bounded in depth by the drainage level, contains the silver in the form of chlorides and bromides, while the lower zone has the decomposed sulphides, apparently impoverishing in depth. Native silver occurs in all depths. Although apparently the veins become poor in depth, running into sterile galena and blende, it is believed from indications in the San Rafael and Maravillas mines, where native copper and rich rebellious ores appear, that a more valuable zone follows. Water has for many years been a troublesome factor in deep mining, and some huge Cornish pumping engines have been installed at different periods, the last having been put in by a concern at Chemnitz, Germany.

The leading mining companies are the Real del Monte & Pachuca Mining Company, the Santa Gertrudis, Maravillas, Barron and San Rafael mining companies. A number of them have modern air compressing, drilling, hoisting and electrical equipment.

Apparently the greater part of the richer ore is now being shipped to outside smelters, Pachuca possessing exceptionally adequate railroad facilities, there being three roads, the Hidalgo & Nordeste, the Pachuca branch of the Mexican Central, starting from the main line at Tula, and a branch of the Vera Cruz.

The leaner ores are treated in local establishments, which, metallurgically, are highly interesting from their variety. Particular attention was directed to the ancient Patio process, discovered by Bartolome de Medina in 1557 in the town of Pachuca. There are four of such plants in the district, the machinery of three of them being driven electrically. The ore is crushed with Blake crushers and ground in Chili mills, the leading *hacienda* being that of Guadalupe. There is added to the ground pulp salt, sulphate and quicksilver, the particular feature of the process being the stirring of the thick pulp in the "patio" by driving teams of mules about it in a circle. The quicksilver severely attacks the hoofs of the animals, which soon drop off, their life being very short.

Besides these plants is the very perfect stamp mill and pan amalgamation, built under the Boss system, at the Hacienda del Progreso, and the modified Kroehnke system of barrel amalgamation at the Hacienda de la Union.

Ample opportunity was given to the engineers to study the details of both the mining and metallurgical methods of the famous district, and the hospitalities offered were lavish and tactful. On the arrival of the train the party was welcomed by Señor Don Rodolfo

Munoz and was introduced at the Palace to the Governor of the State of Hidalgo. Subsequently a trip of inspection was arranged to the mines in the immediate vicinity of Pachuca, including the Santa Gertrudis, the Barron and the Blanca. In order to convey the party the whole State of Hidalgo had been scoured for vehicles, the result being a most extraordinary collection of coaches and four and six mule teams, recalling the olden days of the *diligencia*. An elaborate lunch was served in the barter house of the Santa Gertrudis mine, followed by a series of enthusiastically applauded speeches in Spanish and English.

In the evening there was a session of the institute in the theater of Pachuca, at which the principal paper was that of Ezequiel Ordóñez of the Geological Institute of Mexico on "The Mining District of Pachuca." It was followed by a contribution on a new theory of the Patio process.

The second day at Pachuca was given to a visit to the famous mines of the mining district of Real del Monte, followed by a luncheon in the grove of Hilloche, which was greatly enjoyed by those who participated. Quite a number of the party, however, took the train early in the afternoon to Tula, in order to visit the old Aztec ruins in the vicinity of that old town. The walk was a delightful one, the party joining the special trains later on.

An admirable institution, which occupies an old Franciscan monastery completely modernized, is the Scientific Institute, a good illustration how eagerly the Mexican authorities, Federal and State, are developing facilities for education and study. It is a modern school for mining engineers, surveyors and assayers, and has the beginnings of a fine library, good laboratories and a meteorological observatory.

The next morning found the trains of the institute traveling along the Lerma Valley, rich in agricultural products, with great irrigated fields and extensive *haciendas*. Descending from the high and barren Pachuca mountains the semitropical plain had been reached, and soon the engineers were received by a large representation of local members and notabilities in the city of

Guadalajara,

the second largest city in Mexico, having a population of 107,000 souls. Of all the towns in the republic visited, this created most the impression of bustling activity and prosperity. It possesses to a lesser degree the characteristics which give the capital of the country a metropolitan air. It seems more intensive and more truly Mexican. It is the capital of the State of Jalisco, the most populous and prosperous of the country, its wealth being based principally upon its agricultural resources.

The party were welcomed by a delegation of the Sociedad de Ingenieros de Jalisco, Don Jose S. Schlaffino, a venerable engineer, delivering the address of welcome. Being Sunday, the visitors were left to their own devices. On Monday morning the first point of interest visited was the Hospicio, the city orphan asylum, an enormous institution, containing at times as high as 2000 occupants of all ages. Built in Mexican style, with a series of buildings inclosing *patios*, of which some were filled with trees, shrubs and flowers, the institution seemed the happy home of hundreds of infants, children, old men and women. It was admirably clean and thorough order prevailed. Returning in their special street cars the party proceeded to the principal square, the Plaza de Armas, where the cathedral with its famous Murillo Madonna and the Government Palace were shown. Then followed one of the most interesting tours which the visitors had the pleasure of participating in. By a narrow gauge road the party were taken to the Barranca de Oblatos.

The Lerma River empties into Chapata Lake to the southwest of Guadalajara, this lake, the largest in Mexico, being about 90 miles long by about 30 miles wide. Although there are no large towns, there live on its banks about 150,000 people. From this lake arises the Santiago River, which, after a drop of many feet at the Salto Juanacatlan, the Mexican Niagara Falls,

flows to the Pacific in what is practically a cañon, or "barranca," for over 100 miles. The depth of the cañon varies from 1000 to 1600 feet, and in some of its parts the walls are sheer on both shores. At the point visited the banks consist of a series of terraces of surpassing beauty. Looking down into the cañon there is visible the lower portion of a canal and the power house of an electrical station, which furnishes power for lighting and for textile and other mills and factories in Guadalajara. The canal was built by three parties and through subsequent events the supply has been divided into three parts, the owner of only one of them having thus far developed it partially. There is a head of 65 meters and there is available in all about 10,000 horsepower. It is proposed soon to convert the present horse car lines of Guadalajara into electric lines, and there is also a project on foot to utilize the power at the Salto Juanacatlan.

The high cost of fuel over the greater area of Mexico makes the development of what water power does exist particularly important. With cheap, docile and fairly intelligent labor opportunities are afforded which will probably be fully availed of. Great promise is held out in cotton spinning, even now a very important industry in the republic, based, of course, on the native staple.

The Engineers' Society of Jalisco arranged a charming lunch at the Oblatos restaurant, the long table being spread on the piazza overlooking the cañon. Don Ambrosio Ullon, secretary of the society, delivered a cordial address of welcome, to which President Olcott responded in appropriate terms. Returning to town the party were taken through the residence portions known as the American and the French colonies, and in the evening attended a concert given in the Plaza by the famous Guadalajara Band.

During the night the travelers resumed their journey, reaching in the morning Mafil, the railroad station of

Guanajuato,

and returning thus to the great central plateau of Mexico, the so-called Anahuac. The capital of the State of the same name, Guanajuato, is situated in one of the gulches of the Sierra, at an elevation of about 6300 feet. The houses rise in tier after tier on the sides of the gulches and from the city proper along the course of the river down nearly to the station of Mafil there are a series of walled reduction works, idle and active, all the older with their loop holes for defense against robbers and many with their own chapels within the inclosure. Dating practically from the time of the conquest, Guanajuato has suffered many vicissitudes, as do the majority of towns which depend exclusively upon silver mining. At the present time it has a population of 41,000 inhabitants and quite recently has been experiencing quite a boom, a considerable number of mining men, notably some connected with the Cripple Creek district in Colorado, having purchased mines with a view to their immediate development. It is estimated that the district produced from 1701 to 1800, \$279,690.-689; from 1800 to 1829, \$85,775,642, and from 1830 to 1887, \$277,608,876, a total of \$643,075,207. W. P. Blake in a paper contributed for the Mexican meeting states that from 1766 to 1825, according to Humboldt and, later, Ward, \$225,935,736 was produced from the Veta Madre alone. From 1840, when it was opened, to 1889, La Luz produced \$140,000,000; from 1852 to 1889, La Purissima \$24,000,000; from 1853 to 1889, La Vicente \$270,000,000, while quite a number of others have yielded during the three decades from \$3,000,000 to \$20,000,000 each.

The veins of the very extensive Guanajuato district are grouped in four systems, the central being that of the Veta Madre or "Mother Lode," which aggregates 400 feet in width, dipping about 45 degrees; the La Luz system, about 25 miles southwest of the first; the Sierra system, and the Monte de San Nicolas system, 275 miles southeast of the Veta Madre. Into some of the mines modern machinery and appliances have been introduced, but, on the whole, the old methods still hold sway. The deepest workings are the Valenciana shaft on the Mother Lode and the Asuncion in the La Luz system, the former

being 1765 feet deep and the latter 1400 feet deep. The ores carry chiefly silver, the higher grades being shipped out of the camp. One ore buyer alone sends out about 1000 tons per month. The lower grade ores are treated in local custom beneficiating plants. All of the ore is brought down from the mountain on burros, and in some of the streets of the city there is an almost continuous train of pack mules. Until quite recently the mining industry of the district has been much depressed, but, as already stated, new life has been infused into it largely through the investment of American capital.

After being conducted to the Guanajuato Club, on Union square, the engineers visited the plant and mines of the Guanajuato Consolidated Mining & Milling Company. The mill was not running, being under reconstruction and enlargement. After partaking of an elaborate lunch in the State College and visiting the mineralogical and zoological departments, the engineers went to the parks at La Presa. The narrow gulch is cut up into a series of lakes by dams, surrounded by finely arranged parks, the mountain sides and narrow strips along the borders of the creek being occupied by the handsome houses and beautiful gardens of the rich residents of Guanajuato. In the evening the Juarez theater and a number of the State buildings were illuminated and a reception was tendered to the engineers.

On Wednesday morning saddle horses were waiting in the Cantador Park to carry the miners on mountain trails to the workings of the Valenciana, Cata, Mellado and Rayas mines, all on the Veta Madre. In the afternoon the historical Granaditas building and the Flores patio works were visited. Blake states that during his visit in 1891 there were in Guanajuato upward of 40 reduction works for the treatment of silver ore, in which there were 65 Chillian mills, 301 large *arrostras* and 936 small *arrostras*. The number has much diminished since then.

The town is very quaint in many respects, has fine churches, a mint for the coinage of silver, and to many possesses a feature of interest in its catacombs. C. K.

Shenango Valley Notes.

SHARON, PA., November 23, 1901.—F. H. Buhl of the Sharon Steel Company has returned from a three months' trip in Europe.

The contract has been let for the erection of an addition to the C. H. Buhl Hospital at Sharon, Pa. The hospital is supported largely by the iron interests of Sharon.

The Bessemer Foundry Company have been organized at Grove City, Pa., with Benjamin Spearman of Sharpsville as president, and J. M. Albin of Mercer, Pa., as general manager.

Experiments made with steel ties on the Bessemer & Lake Erie Railroad for a half mile over a short curve near Greenville, Pa., are reported by officials of the company to be entirely successful after a year's trial. These ties are made of steel plates $\frac{1}{2}$ inch thick and the width of wooden ties, bent in a semioval shape. A recent report of the foreman having that section of the road in charge to E. H. Utley, manager, says that the ties are as good as new and give entire satisfaction. The road on which this successful trial has been made is one of the Carnegie Company interests. Should the plan become generally adopted on account of the scarcity of timber it would require many more steel mills to supply the demand, as steel ties require more steel than rails. The forests have been almost stripped of timber suitable for ties, (and for years the railroads have been looking for a substitute for the hard woods.

No Duty on Dutch Metal Clippings.—The Treasury Department has decided under date of November 12 that Dutch metal clippings are free of duty as "composition metal of which copper is a component material of chief value." These clippings are the product resulting from the process of the manufacture of Dutch metal leaf, composed of copper and tin or spelter, and are used for further manufacture into bronze powder.

Trade Publications.

Runskool Antifriction Metal.—A neat little pamphlet has just been issued by the Runskool Metal Company, 13 Cedar street, New York, describing a metal which this company have placed on the market adapted to the requirements of those who need an antifriction metal for bearings. The pamphlet states that this metal is now in use in a large number of leading manufacturing plants, and on many important railway systems. Strong claims are made for it. The pamphlet contains a number of testimonials received from those who have been using it.

Manganese Steel, Steel Castings and Forges.—The Taylor Iron & Steel Company, at High Bridge, N. J., according to a pamphlet just issued, occupy a site of considerable historic interest, one of the earliest works for the production of iron in America having been established there about the year 1710. During the Revolutionary War much material was supplied the Continental forces, but the exhaustion of the supply of charcoal caused the closing of the works in 1782. In 1852 a new forge was built on the site of one of the old ones. A car wheel foundry was added later, and finally the present company were incorporated and a steel works erected. The works now comprise a steel casting plant, a car wheel works and a forge, together with well equipped machine shops for finishing work. At the works are made all kinds of steel and manganese steel castings and armor piercing and explosive shells. At the car wheel works are made welded center steel tired car and locomotive wheels, chilled cast iron car wheels and other chilled iron and gray iron castings. At the forge are made both iron and scrap iron axles and forged steel and iron shafts, car and driving wheel axles. Manganese steel made in accordance with the Hadfield system, the exclusive rights to manufacture which in America are controlled by this company, is particularly celebrated for its toughness and wear resisting qualities, making it particularly serviceable in all appliances where great strength and durability are essential.

Steam Engines and Boilers.—The F. E. Rairier Machinery Company, 153 South Jefferson street, Chicago, have issued a catalogue dealing with their vertical and horizontal engines and boilers. Their center crank engine with throttling governor is of the single slide valve type. The valve is a common D-valve accurately balanced by a circular plate on the back, in which is a floating ring. This ring comes in contact with the steam chest cover, and is kept in place by the pressure of the steam. In case of water or excessive pressure in the cylinder it allows the valve to rise from its seat, thus avoiding a broken cylinder head or general wreck. A single casting forms the cylinder and steam chest. The ports are long and narrow, thereby reducing the travel of the valve and allowing both valve and seat to wear straight. The cross head is long, has large wearing surfaces and has a steel wrist pin. The connecting rod is of hammered iron and provided with bronze metal boxes. These engines are built in sizes from 4 to 70 horse-power.

Hot Water System Exhaust Heating.—Evans, Admiral & Co., 44 Dey street, New York, have prepared a catalogue dealing with their system of exhaust hot water heating. In this method hot water is used as the heating medium, being circulated through a system of mains similar in construction to those used in ordinary steam heating. In order to accelerate the natural circulation due to the difference in density of the water in the supply and return mains there is introduced in the circuit a small centrifugal pump driven either by belt, direct connected engine, or motor. This insures a positive, rapid and perfectly controllable circulation in all parts of the system. Exhaust steam is used for heating the water, the method being such that there is absolutely no back pressure on the engines. The action is quite like that of a condenser, to which indeed the heater is similar in design. The water circulates in a space around the tubes, where it absorbs the heat of the

exhaust steam, thereby condensing it. The condensed steam can afterward be either collected and returned to the boiler, or it can be allowed to go to waste. This exhaust heater can be placed so that it will utilize the exhaust steam from a condensing engine. This company have just received the contract for heating the large new shops of the Allis-Chalmers Works at Milwaukee.

The Milwaukee-Rice Machinery Company, Milwaukee, Wis., now have in press a new catalogue of machinists' supplies, tools and machinery containing over 500 pages devoted to those lines. This catalogue is to be known as "The Machinist Supply Book of the Northwest." The company have long been prominent in the lines of power transmission appliances, such as pulleys, shafting, hangers and belting, and are the only manufacturers of leather belting in the State of Wisconsin. The book will be out of the press about January 1, 1902.

A pamphlet has been received describing the electric smelting furnace which is now being manufactured by the Hatch Electric Smelting Company, Green Bay, Wis. The company build a revolving furnace, which is applicable to the smelting of gold, silver, copper, zinc and lead, as well as iron ore. It is claimed by the company that the process invented for the operation of this furnace more perfectly controls the current than any other electric furnace. It is further claimed that the invention of this furnace will make it possible for every mine to own its own smelter, thus saving to itself all the profits which now go to the customs smelter, as well as the heavy freight charges of shipping ore from the mine to the smelter.

Henry B. Newhall, 26 Cortlandt street, New York, has issued an illustrated circular descriptive of the Diamond expansion bolt and shield. The circular illustrates the application of this device to the fastening of electrical instruments, switch boards and other electrical work, to walls of brick and stone, concrete, terra cotta, or any other class of masonry. The circular states that the large subway companies have adopted the Diamond expansion bolt for fastening the cable supports in the manholes which they construct in their work throughout the country.

The York Mfg. Company, York, Pa., have issued a neat little pamphlet which gives the particulars of some recent sales of their ice making and refrigerating machinery. The list of sales is lengthy, and shows that the company's machinery is not only being furnished to all parts of the United States, but also goes to many countries throughout the world.

We have received from Walter H. Wangelin, chemist, St. Louis, a copyrighted table which he has prepared for the purpose of enabling foundrymen to calculate the mixture of iron. This table is a mathematical guide, designed as an assistant to foundrymen who are not thoroughly familiar with the principles governing mixtures or who do not have the facilities for making analyses of the irons which they purchase and use. An accompanying pamphlet gives full directions how to use the table. The system worked out by Mr. Wangelin is quite ingenious and will doubtless prove of great value to foundrymen generally.

Unprecedented Expenditures for Railroad Equipment.—The expenditures to be made by the Pennsylvania Railroad Company in 1902 for rolling stock will aggregate \$25,000,000, a sum unprecedented in railroad history. Of this amount \$19,000,000 will be expended for cars and the other \$6,000,000 for locomotives. As already announced, the company will require 19,000 freight and coal cars for 1902, the greater number of which have been already ordered. While no locomotives for 1902 delivery have been ordered, the requirements in that direction for next year have been determined upon approximately at 400. This year the company built in their own shops and ordered from other companies about 300 locomotives and between 6500 and 7000 cars, compared with which the locomotive requirements for next year will be 33 per cent. greater, and the car requirement nearly 300 per cent.

The Reciprocity Convention.

WASHINGTON, D. C., November 26, 1901.—The National Reciprocity Convention, which was held in this city on the 19th and 20th inst., concluded its labors one day in advance of the official programme by the adoption of a series of resolutions partly foreshadowed in the telegraphic report of *The Iron Age* last week. The convention voted, with but two dissenting ballots out of the 200 cast, in favor of a resolution recommending to Congress "the establishment of a reciprocity commission which shall be charged with the duty of investigating the condition of any industry and reporting the same to the Executive and to Congress for guidance in negotiating reciprocal trade agreements," and by a unanimous vote adopted a resolution urging Congress to create a new department "to be called the Department of Commerce and Industries, the head of which shall be a member of the President's Cabinet; and that the reciprocity commission be created as a bureau of this department." In explanation of these resolutions it was announced that Congress would be asked to authorize the commission immediately, with the understanding that when the Department of Commerce and Industries should be organized the commission, with all its machinery, would be incorporated as one of its bureaus.

The action taken by the convention was disappointing to the advocates of the ratification of the pending reciprocity treaties, although apparently designed to lay a broader foundation for the negotiation of reciprocal trade arrangements in the future. High protection sentiment dominated the convention from first to last, and the fact early became apparent that while many interests having much at stake in the pending treaties had failed to take advantage of the opportunity to send delegates, the well organized protectionists in all sections not only furnished their full quota of delegates but instructed them to oppose vigorously any form of reciprocity broader than that limiting concessions on foreign products to those which are not, and cannot be, produced in the United States.

The real work of the convention was accomplished behind closed doors by the Committee on Resolutions, to which were referred without reading all the resolutions presented by delegates, about two score in number, covering every phase of the reciprocity question, the majority, however, declaring against any form of reciprocity "calculated to deprive a single American workman of a day's labor." Several resolutions were directed against the French treaty, declaring it to be "a blow at American industries," and so strong was the feeling of certain of the delegates against this treaty that A. B. Ballantine, a Bennington, Vt., knit goods manufacturer, braved the displeasure of the convention and violated one of its rules by rising to a question of privilege and reading a resolution declaring it to be the sense of the convention that the French treaty should not be ratified.

Several resolutions were presented favoring reciprocity with Canada, this proposition being advocated both by New England delegates representing the general commercial interests of their section and by the lumbermen of Michigan and Wisconsin, who have been unable to bring to their saw mills in the United States logs cut from stumpage purchased by them in Canada prior to the adoption of the present lumber tariff, which the Canadian Government has made the excuse for a parliamentary decree prohibiting the exportation of logs from the province of Ontario. This action has left the Michigan lumbermen with no raw material for their mills and they have been obliged either to suspend operations altogether or to move their plants to Canada, cut up their stumpage, and ship their lumber to the United States, paying \$2 per 1000 feet duty thereon.

The resolution presented by F. B. Thurber advocating reciprocity with Cuba on the basis of a reduction in the Dingley rates on sugar and tobacco was followed up by its author with an urgent appeal to the Committee on Resolutions to give favorable consideration to the proposition, and if possible to report it to the convention for action. Mr. Thurber based his appeal on humanitarian grounds chiefly, but declared that a reciprocal arrange-

ment with Cuba would result in a short time in the absorption by American manufacturers of the entire trade of the island.

When the Committee on Resolutions took up the various propositions referred to it it became apparent, first, that a majority of the committee was opposed to any favorable action on the pending treaties; and, second, that no resolution could be reported that failed to announce the adherence of the convention to the protective principle, and to a reciprocity policy strictly limiting concessions on foreign goods not produced in the United States. The cotton knit goods representatives who were called in conference with the committee were openly defiant in their assertions that any resolutions favorable to the French treaty that might be reported would be defeated in open convention, and this declaration was supported by the representatives of other interests. The manufacturers of agricultural implements, under the leadership of Messrs. Deering and Farquhar, labored earnestly with the committee in the interest of the French treaty and also in favor of a declaration for a broad policy of reciprocity, but it was early apparent that these efforts would prove futile.

While the Committee on Resolutions was in session the advocates of a broad policy of reciprocity presented two strong arguments to the convention, one by Richard S. Young, a leather manufacturer of New York, and the other by James Deering of Chicago, manufacturer of agricultural implements. Mr. Young's address was an exhortation to American manufacturers to arouse themselves to a realization of the impossibility of continuing to enjoy the present degree of prosperity without adopting a policy designed to open up markets for the absorption of our constantly increasing surplus. The time had passed, he said, when any single industry should be protected simply to enable those engaged in it to make excessive profits to the detriment of the consumer at home as well as other domestic manufacturers. Mr. Deering, who made a strong appeal for the ratification of the French treaty, said in part:

"America is producing a surplus. One and a half billion dollars of her products are not needed at home and are sent abroad. Senator Foraker said in the late Ohio Convention: 'We must have markets for our surplus or quit producing it.' No manufacturer among us would deny that the corner stone on which our industrial greatness has been reared has been protection. Can we believe that protection has now done its perfect work? No one of us can believe it. There are yet industries that need the fostering care of a home market saved to them from all intrusion, until from tottering they may walk erect, and finally putting forth their strong young wings they, too, may swell the cloud of commercial manufacturers that carry the great American surplus into every foreign land. But there is still another duty left to the American policy of protection. It was my privilege to hear our late honored President McKinley say 'What does our protection mean if it does not mean protection to the American manufacturer abroad as well as at home?' Does the duty of government stop with protecting life and liberty of the citizen abroad? Is nothing due to the farmer who sees Germany about to double the duty on wheat, or to the manufacturer whose \$6,000,000 worth of machinery is sacrificed in Russia to the \$250,000 on sugar imported into the United States?"

Mr. Deering dwelt with special emphasis upon the menace to American exports involved in the probable passage of the new German tariff bill, which he said was declared by the German Minister of Commerce to be designed "to show to foreign nations what they may expect from Germany if they decline to make with her commercial treaties." Retaliation, he thought, was designed by Russia and France. In any event, the United States occupied the illogical position of being practically the only important manufacturing nation not enjoying the minimum schedules of the French treaty.

The Committee on Resolutions signified its readiness to report on Wednesday afternoon and the chairman, Mr. Tompkins, said that after examining carefully all the propositions before the committee the following reso-

lutions had been prepared for presentation to the convention:

Whereas, The growth of manufactures in the United States, represented in values and in round numbers, has been as follows: 1850, \$1,000,000,000; 1860, \$2,000,000,000; 1870, \$4,000,000,000; 1880, \$5,500,000,000; 1890, \$9,000,000,000; 1900, \$15,000,000,000;

And whereas, These figures exhibit at the same time, (1) a splendid result for the past industrial policies of our Government, and (2) a growing need for the development of larger markets in foreign countries;

And whereas, It would seem desirable not only to maintain policies under which such splendid results have been accomplished, but also devise means to develop increased markets for the increased and increasing manufactured products; therefore be it

Resolved, (1) That this convention recommends to Congress the maintenance of the principles of protection for the home market and to open up by reciprocity opportunities for increased foreign trade by special modifications of the tariff in special cases, but only where it can be done without injury to any one of our home interests of manufacturing, commerce or farming.

(2) That in order to ascertain the influence of any proposed treaty on our home interests, this convention recommends to Congress the establishment of a reciprocity commission, which shall be charged with the duty of investigating the condition of any industry and reporting the same to the Executive and to Congress for guidance in negotiating reciprocal trade agreements.

Whereas, The present and increasing magnitude of the aggregate manufacturing and commercial interests of the United States have become far too great to be adequately handled by any of the existing Government departments; and

Whereas, Changing phases of these great interests are constantly bringing new and important questions, the proper determination of which would require all the work of a department fully organized and equipped; therefore be it

Resolved, (1) This convention recommends to and requests of Congress that a new department be created, to be called "the Department of Commerce and Industries," the head of which shall be a member of the President's Cabinet.

(2) That a reciprocity commission be created as a bureau of this new department.

In reply to several inquiries as to why no reference was made in the resolutions to the pending reciprocity treaties, Chairman Tompkins stated that he and his colleagues had been unable "to secure information adequate to the determination of the important question as to whether any of the treaties should be ratified, and therefore the committee deemed it best to make no reference to them." A vote being demanded on the resolutions, that first presented was adopted with but three dissenting votes, one of which was subsequently withdrawn. The second resolution was adopted unanimously.

The officers of the convention were instructed to present to President Roosevelt copies of the resolutions adopted "in view of the fact that he is about to draft a message to Congress." All delegates were also requested to communicate the resolutions to the various organizations represented by them with a view to bringing united influence to bear upon Senators and Representatives in the hope of securing prompt action upon the recommendation for a reciprocity commission and a Department of Commerce and Industries.

The question now arises as to the probable fate of the pending treaties and, if the views of the convention which has just adjourned shall prevail, it would seem to involve the manner in which they are to be disposed of, either by their withdrawal by the President, their rejection by the Senate, or their death by expiration in September, 1902. If the programme of the convention is generally accepted, the future of reciprocity will depend solely upon the action of Congress with regard to the recommendations looking to the appointment of a commission and the authorization of a Department of Commerce and Industries.

W. L. C.

On a ten-hour shift, November 21, the Phoenix Iron Works, Phoenixville, Pa., rolled 120 3-10 tons of finished 6-inch 12½-pound beams. This tonnage was rolled on a 24-inch train driven by a pair of 28 x 48 inch reversing engines, built by Mackintosh, Hemphill & Co. The mill is equipped with electrically driven tables, electric charging and drawing machine and transfer car, designed by the Wellman-Seaver Engineering Company, and is said to be the most complete mill of its kind in the country.

Notes from Great Britain.

The Trend of Trade.

Although iron and steel manufacturers are still busy in nearly every department, at the present moment there are no signs of good trade after Christmas. It is agreed that the mills will work full time up to Christmas, but buyers are persistent in their belief that after that prices will come down. The makers are equally emphatic that they cannot reduce their prices. Marked bar makers are not only busy, but are maintaining their prices remarkably well, but the unmarked bar men, notwithstanding their association standard prices, are pushing hard for business and cutting the market all round. This is as much due to severe competition from Belgium as to a feeling that we are nearing the end of our trade boom. In steel the German competition to which I have previously referred continues unabated. It is agreed on all hands that the Germans are bound to unload their stocks in consequence of monetary difficulties. Railway rolling stock makers are now being asked to tender for large quantities of stock for India, South Africa and other places, and it is expected that next year this trade will continue in a flourishing condition. Structural engineers report that competition is as severe as ever. On the whole, while in the iron and steel trades considerable activity is evident, yet trade generally is not encouraging. In France there is a regular current of orders and good prices are obtained in the finished iron trade. Thus northern makers refuse to accept less than \$30 a ton for small lots of No. 2 bars. The Pig Iron Producers' Syndicate have advanced prices 5 francs a ton for delivery up to the end of the year, thus making No. 3 foundry iron 70 francs a ton. In the steel trade a considerable distribution of orders for railway material has been made by the State, which has also renewed its purchases of armor plates. Notwithstanding severe Belgian competition, due to the steady depreciation of Belgian rolled iron prices, it may be said that the French metal market is in a fairly healthy condition. Turning now to Germany, all the reports one hears of the trade depression there are emphasized by the reports of the meetings of the big industrial companies, showing heavy reductions in earnings. In a previous letter I have referred to the association of German iron and steel makers sending out two delegates to India to report upon the prospects of developing an Indian market. Prior to that Krupps' also sent two representatives to India. And now comes the announcement that the great Essen firm are sending another representative to India and the East Indies and another to China, Japan and Australia. In connection with this attempt to capture the Eastern trade it may be stated that during the past year Krupps' have shipped a great quantity of material to the Dutch East Indies.

Preparing a Big Report.

The deputation which has recently been visiting America from the British Iron Trade Association to inquire into the ascendancy of the American iron and steel trades, has collected an immense amount of material which will be embodied in a stupendous report which will probably extend over 1000 pages. The inquiry is not yet over, as I understand that some more delegates are going out. I had the pleasure of returning to this country on the "Campania" with E. Parkes, M.P., the Birmingham ironmaster, who is president of the Institute. Mr. Parkes was greatly impressed with all that he saw in America, this being his first visit. He thinks that one of the greatest contributory causes to the success of America is the freedom from restrictions which American manufacturers enjoy. He is further impressed with the workings of the numerous American trusts, and the United States Steel Corporation in particular. He has his doubts, however, whether British manufacturers in self defense will follow somewhat similar lines of combination. He thinks further that unless greater freedom can be obtained for masters and men to work out various schemes for the advancement of the industry, British interests will be placed in jeopardy, but he is not hopeless, and has great belief in the vitality of the British manufacturer.

The Shipbuilding Trade.

Whatever may be the state of trade elsewhere there is unusual activity among shipbuilders, a fact which American exporters of structural material will not be slow to note. From the last quarter the vessels under construction represent a tonnage of 1,414,120, an increase of 105,000 tons over the corresponding period of last year. Nor do these figures include war ships. It must be borne in mind, however, that freight experts are bitterly complaining about low freightage. I venture to quote the following, which throws some light on the shipbuilding situation: "The condition of the freight market seems to get from bad to worse, and it is interesting to note the effect on the shipbuilding industry. Needless to say there is no inducement for a shipowner to order new steamers to be built, with steel ship plates at £6 to £6 5s. per ton, shipyard and engine shop labor at the highest levels ever reached, and bunker coal at 11 to 15 shillings per ton, when for the use of his present vessels he cannot obtain more than 5 shillings and a few pence per ton for Genoa, 9 shillings from the United States to the Mediterranean, and other rates in proportion, with the frequent necessity to make one-half of a voyage in ballast in order to take up an unprofitable charter."

The American Influence.

Evidently the visits that so many British iron and steel masters are paying to the United States are having some effect. At the last meeting of the Weardale Steel, Iron & Coke Company Sir Christopher Furness intimated that certain radical changes must become necessary in order to meet American and German competition. He indicated that either some of the works must be closed down and entirely reorganized, or more probably removed to some seaport for more effective competition. I now learn that the office staff and also large numbers of workmen have received notice to quit the Tudhoe Iron Works. These works are part of the reconstructed company which Sir Christopher Furness took in hand last year on a capital of \$2,000,000.

A New Development.

Last week a new furnace at Darlaston Green was blown in. There are one or two interesting points in connection with this. This new furnace stands beside the original one built in 1851. It is 71 feet from the base to the dome, within which the furnace gases are confined and carried off to provide motive power for the blowing engines and the other furnace machinery. The shaft is steel cased on modern lines, with an internal capacity of 16,000 cubic feet, and it is capable of producing 1400 tons of pig iron per week with a blast of 25,000 cubic feet per minute. There is an important alteration also in connection with the tuyeres. The pipes are retained, but instead of forcing the water it is drawn by vacuum suction. Although the difference appears to be immaterial, yet various experiments lead to the conclusion that the alteration is one of great value. A second improvement is valued much more highly. The idea is to use a vertical retort from which heated carbon dust can be blown into the furnace through the tuyeres together with the hot blast. In the past attempts to blow in cold carbon dust have not been successful, but the application of heat will, it is believed, remove the former difficulties. The injection of carbon in this fashion has one or two advantages. It promotes economy of fuel, and of course labor, for under such circumstances the quantity of coal and coke to be taken up to the bell and dropped in from the top is diminished. In addition it facilitates the regulation of the furnace and gives such absolute control over the making of iron that it is believed that any particular grade required can be produced merely by increasing or diminishing the amount of carbon dust blown in.

Rolling Stock.

Large orders have come to this country from Natal, South Africa, for rolling stock, the value of the orders amounting at the present time to about \$2,000,000. Sir C. Elliott, the Cape Railway Commissioner, has been traveling in Europe, in this country and in America, with a view of finding the best articles for purchase by the

South African railways; only a small proportion, about \$3000, has gone to America. At the same time a broad hint is given that English makers must quicken the rate of delivery if they are to secure orders in the future. Orders sent to America for engines were supplied in less than ten months, while British firms took anywhere from 12 to 18 months, despite offers of premium for delivery in advance of the contract time. The American engines were satisfactory, and the price much lower than the British. An order for rails was placed on the Continent at £4 13s. 9d. per ton, while the lowest British tender was £4 14s. The Agent General is authorized to give British firms a preference of 10 per cent. This seems an indirect way of imposing a tax.

A New Armor Plate Maker.

At the forthcoming armor trials, in which will be tested the 20-foot target to 6 inch and 4 inch armor plates, a new maker will try his luck. This is J. Bedford of Meadow Steel Works, Well Meadow Street, Sheffield. In addition to Cammell & Co. of Sheffield, Beardmore & Co. of Glasgow, Armstrong & Co. of Openshaw and Vickers Sons & Maxim of Sheffield will compete.

S. G. H.

The Turner, Vaughn & Taylor Wire Truck.

The body of the new wire truck here illustrated is framed from structural steel, which insures great rigidity with a corresponding saving of weight. The saddle housings to which the wheels are fastened have a long



THE TURNER, VAUGHN & TAYLOR WIRE TRUCK.

bearing on the sides of the bed, so as to overcome any tendency of the body to spring. The ends are deep Vees which will hold without rocking coils of wire or rods from a diameter of 26 to 42 inches, and in the case of the 26-inch bundle the vee is deep enough for the yoke bar to be removed easily without resting in the vee. This covers the whole range of cleaning house work. The main wheels have a solid web section preventing articles catching in them, thus overcoming the worst failing of the spoked wheel. They are furnished with roller bearings in the main wheels. The frame is thoroughly braced throughout. This truck, of 2 tons capacity, weighs 400 pounds, and is manufactured by Turner, Vaughn & Taylor Company, Cuyahoga Falls, Ohio.

The Kansas State Board of Agriculture announces that the winter wheat yield in Kansas for 1901 was 90,045,514 bushels, valued at \$50,479,570. This breaks last year's State record by 13,450,070 bushels. The area now sown in winter wheat is nearly 6,000,000 acres, which with favorable weather will yield more than 100,000,000 bushels. The corn crop in Kansas in 1901 was only 42,605,672 bushels, but the value of the combined wheat and corn crops was only 11.3 per cent. less than that of the same crops in 1900.

Lake Mining Matters.

DULUTH, MINN., November 23, 1901.—As a striking evidence of the way in which iron ore shipments are increasing is the fact that Minnesota will send out this year more ore than the entire lake region shipped in any season preceding 1897, had in fact done about as much as the region's total of 1896 prior to November 1 of this year. This is, of course, due to a large extent to the increasing use of Mesaba ores, both in gross and in the percentage of furnace mixtures. As time goes on and furnace managers are forced to experiment with larger percentages of Mesaba ores they find that the obstacles to their use, so serious in the earlier years at most works, are not now noticeable. The pressure from the financial end for a greater proportion is answered by an increased consumption and less frequent complaints from the furnace end. The use of 100 per cent. Mesaba ore is not now unknown or uncommon and some of the most remarkable results attained in furnace practice in this country have recently been with an unusually large proportion of rather fine Mesabas. I have before me as I write the return of a furnace in the Valley that seems to me a most remarkable performance. It is a furnace of 70 feet high, 10-foot hearth, 14-foot bosh, 12 5-inch tuyeres and a 7-foot bell that has been working on an average of 87½ per cent Mesaba with the following result: Average 255 tons during present blast, 270 tons in one month, 290 tons in one week, 301 tons in one day. The consumption of coke was under 2000 pounds to the ton of iron and the ore yield was 56 per cent. The least amount of Mesaba ore used was 75 per cent. Two well-known Mesaba ores furnished most of the mixture.

The subject of the so-called "independent" miner on the Mesaba has been threshed over a good deal during the past few days, on account of the late decision of the Minnesota Railway Commission that it cannot interfere with the rates charged by the Minnesota ore roads. I want to note in this connection that the independent miner is making a greater proportion of the output than ever in the history of the Mesaba range, the independent miner being the concern who have no railway connection to the lake, and now no association with the United States Steel Corporation. He produces this year about 35 per cent. of the output of the range, and the indications are that his share in 1902 will be actually and proportionately greater than this. In most of the theoretical discussion of the question this practical point has been overlooked. Of course there has been a demand for iron never before reached, and the independent has felt compelled to strengthen his position, but is it not a little suggestive that he is doing—now more than ever—what it has been positively stated he cannot do at all.

There is some shipment still, and on the Mesaba most of all. There the Adams, Fayal, Stevenson, Sparta and Pillsbury were loading ore to-day, though if all of it gets to Cleveland this year is a question. On other ranges business is about over. On the Menominee, Chapin, Pewabic, Aragon, the most of Crystal Falls group are done and cleaned up, and are beginning to stock ore for next year. On the Marquette nearly all are through and very little ore is moving from Ashland. The United States Steel Corporation are putting many of their ships into grain and cleaning up carrying contracts from other ship owners. Grain rates have advanced to 4 cents a bushel and ore is up correspondingly to \$1.50 a ton.

It looks to-day as though the season's total would be in excess of 20,000,000 tons. The Menominee range has broken all records with an output of nearly 3,600,000 tons, which is to be compered with 3,260,000 tons last year and with 3,400,000 tons in its preceding record year. The Gogebic has broken its record also, as have both the Minnesota ranges, with a total from the State better than 10,500,000 tons. The new Michipicoton range (Clergue enterprises) will clean up about 350,000 tons. And there are the rail shipments, which make a fairly large average.

Fayal mine has fallen a trifle short of 1,700,000 tons, against 1,252,000 last year. No other lake mine gets much above 1,000,000 tons. Fayal's record is unique and enormous. Mountain Iron has above 1,000,000, Adams group, including Adams, Spruce, and Cloquet, has 1,100,-

000 tons. The group is practically one mine of eight shafts, and is under one management. It is a Steel Corporation property, with Superintendent J. H. Hearing in direct charge.

The old Volunteer mine, belonging to General R. A. Alger and associates, and located south of Negaunee, at Palmer, is to pass into the hands of the Union Steel Company, Donora, Pa., and will be reopened at once with O. B. Warren, late of the Mahoning, in charge.

The Volunteer was worked last year by the Cleveland Cliffs Company, but after unwaivering and examining the property several months, they permitted it to revert to the fee holders. The mine's total shipment has been 1,152,000 tons, mostly in the early days, but 48,000 last year. This gives the Union Steel Company three ore properties, two on the Mesaba. Their find in 59-15 is showing up splendidly.

At the Sharon Steel Company's magnificent big property on the Mesaba they have ceased shipment with an output above 60,000 tons. They are now working steadily both on surface and underground, increasing the stripped area, now about 400 x 500 feet, and opening more drifts for milling. A belt line tunnel will be driven on the main level, around the outer edge of the stripping overhead and all tramming will be in one direction. Probably not much ore except that broken in development will be hoisted this winter. The company are increasing their known ore body both north and south.

An interesting find, though nothing can yet be said of its importance, has been made in section 36 T 59, R 17. This is in a taconite geological island in the older formation, and lies three miles north of the northern limit of the Mesaba ore bearing member. The find is not at all a characteristic Mesaba ore, but is a very hard, somewhat banded magnetite, similar to ores of the East Vermillion. One pit is being sunk in the northwest quarter of the southwest quarter of the section, which is State owned land. A depth of 20 feet is reached, 15 of which is ore gradually improving with depth. It is banded horizontally with red and black jasper. Explorations will be continued, but should be conducted differently to secure best results.

Nearly 60,000 tons of one grade of lump hematite ore has been shipped from Minnesota this year, running 66.95 iron and 0.03 phosphorus.

Figures of shipment of the Sparta-Malta given last week at 400,000 tons should have been 300,000 tons.

The Snyder-Oliver Mining Company, owning the lease of 160 acres in 22, 23 and 27, T 58, R 20, Mesaba Range, is preparing to open. The D., M. & N. road will build in at once. A large four-compartment shaft is being sunk, a heavy boiler and engine equipment are on the ground, and the mine will ship heavily in 1902. The mine has no name yet, but the property is what was bought under the name of Shenango Iron Company for \$500,000 less than a year ago. On the Snyder 40 close by, that was purchased under a contract by Mr. Snyder to supply ores to the Crucible Steel Company of America, five steam drills are at work in an effort to extend the ore body.

D. E. W.

A New Rolling Mill and Spike Factory.

Timmes & Hecht, successors to Peter Timmes' Son, who have for some years operated a plant in Brooklyn, N. Y., have completed their new rolling mill and spike factory, at Scranton, Pa., which they have had under construction for the past six months. This week the rolling mill will be put in operation and by December 1 they expect to have the spike factory fully equipped and ready for operation. The plant is equipped throughout with the best and most modern machinery and furnaces and will start on a large number of orders for bar iron and spikes, which the firm have booked with every prospect of a largely increased tonnage in the near future. In addition, a complete galvanizing plant with the latest improved methods is under construction, which will be used for galvanizing part of the firm's own product, and for a general galvanizing business. The firm consists of John Timmes, formerly of Peter Timmes' Son, and H. T. Hecht, formerly superintendent of the Lebanon Iron Company, Lebanon, Pa.

The Iron Age

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DAVID WILLIAMS COMPANY,	- - - - -	PUBLISHERS.
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GEO. W. COPE,	- - - - -	ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS,	- - - - -	HARDWARE EDITOR.
JOHN S. KING,	- - - - -	BUSINESS MANAGER.

Manufacture of Black Plate to Be Revolutionized.

We are enabled to make the authoritative announcement that the American Tin Plate Company are about to make a radical departure in the manufacture of black plate. They propose, briefly, to revolutionize the method of producing black plate, which will greatly cheapen the cost of the production of tin plate. The process which is to be introduced is one developed by the company and has no reference whatever to any new method which has been brought out by other parties. The construction of a plant on these new lines will be started at once, but its location, for special reasons, is not disclosed. That will, of course, be known in the near future. The new method is not an experiment, as satisfactory tests have shown that the machinery devised will do from two-thirds to three-fourths of the work which is now done by hand, and the output per mill will be increased to three or four times the possible output under the present system.

Automatic machinery has replaced skilled labor in almost every other line of iron and steel production, greatly reducing the number of men employed and the cost of labor per ton of product. In the manufacture of tin plates the introduction of labor saving machinery has been a most difficult problem, as many obstacles had to be overcome, but this has been accomplished by the American Tin Plate Company, and as great progress in manufacture in this line is promised with the construction of the new plant as has been shown by the developments in any other line.

Several years possibly may be required to build and equip a sufficient number of mills on the new plan to care for the full requirements of the trade, but the benefit of cheaper production will be felt from the time the first plant is constructed and in operation. Eventually the large business now going abroad for tin plates to be manufactured into goods for export, and on which a rebate of 99 per cent. of the tariff duty is refunded to the exporter, will be retained in this country. This, of course, leads to the natural expectation that an export trade will be established in due course of time.

The Reciprocity Convention.

It has been asserted with confidence that there is a sentiment in favor of reciprocity growing throughout the United States, and there seems to be little doubt that the broad principle of reciprocity is recognized as an essential element in our future national development. The late President McKinley's assertion that "we must not repose in the fancied security that we can forever sell everything and buy little or nothing," was the fruit of much thought derived from an accurate knowledge of commercial and industrial affairs and a profound insight into human nature.

But even so, Mr. McKinley did not advocate the precipitous action which extremists would compel; he knew that any changes in our tariff policy must be made

with the utmost care and caution, that no injustice be done to any American industry.

The deeper one goes into the subject the more convinced is he that circumspection must be exercised; the phases presented vary with the standpoint of consideration, and each industry has a different viewpoint.

It is evident, then, that mutual concessions must be made by conflicting domestic interests before it is expedient to negotiate treaties with foreign countries, and such action requires business men to rise superior to petty considerations; to sacrifice something to the general welfare.

In the light of an intelligent view of the subject the recent Washington convention, held under the auspices of the National Association of American Manufacturers, to consider reciprocity, was an example of the prevalence of a broad minded spirit among patriotic American business men. The convention was eminently conservative and equally harmonious, and the adoption of the resolution recommending to Congress the establishment of a reciprocity commission, which shall be charged with the duty of investigating the condition of any industry and reporting the same to the Executive and to Congress, for guidance in negotiating reciprocity trade agreements, was both timely and wise.

This is assurance that no violence will be done any interest, but with full knowledge and understanding will come proper Congressional action, for the people will demand the exercise of the legislative power when they feel that it is desirable.

Famine In Spot Tin.

Of all metals tin is the most erratic in movement, subject to violent speculation, sudden, sharp and wide fluctuations of prices, periodical corners and what not. At times trading is attended by great excitement, at others the mood of the market is as gentle as a lamb. Taken all in all, tin—pig tin—affords as many opportunities for profit and loss as the stock market, and as many elements of chance enter into its barter as bewilder the guests of Monte Carlo.

The relative scarcity of tin and its mining in widely separated districts throughout the world make possible peculiar and dramatic situations. But with all the provoking eccentricities the furies in tin are of an ephemeral nature—too intense to last long.

It is only within very recent years that this country has been directly and intimately connected with the rise and fall of tin, although always indirectly interested. But with the growth of the tin plate industry the market for pig tin has become a matter of the greatest importance and solicitude to domestic dealers and consumers.

Recent statistics reveal the rapid, large and important increase in the domestic manufacture of tin andterne plates. In 1900 about 302,000 tons were produced, against 18,000 tons in 1892, while imports decreased from about 330,000 tons, valued at \$24,000,000, in 1890, to 60,000 tons, worth less than \$5,000,000, in 1900.

In the present state of unprecedented activity in iron and the active demand experienced for its close relations, such as steel and tin plate, a corner in pig tin is of more than usual interest.

Ordinarily it is London that sets the other markets of the world ablaze, and not infrequently Singapore offers a surprise, but at present New York is feeling the effects of a famine in spot tin in which the other tin markets, consumptive and productive, are but little interested, the conditions prevailing being entirely of a local character.

From November 1 to 24 the arrivals of pig tin at the port of New York were scarcely sufficient to meet the consumptive requirements for one week. But two weeks ago it became evident that the spot supply was short and the light stocks were found concentrated in the hands of one firm, who have cornered the local market on several previous occasions.

The delay of steamers laden with tin has aggravated the situation and added to the distress of dealers dependent upon the stock in transit to make November deliveries. Naturally there has been an heroic effort made by consumers to remain out of the market, all sorts of expedients being resorted to. But wants became so pressing, and efforts to borrow or beg unavailing, that on Monday some consumers were forced to purchase supplies at prices 5 cents per pound higher than were current on November 8.

The arrival of the steamer "Jupiter" on Saturday last gave some slight relief to the hungry market, and there is now afloat from Singapore, Penang, Rotterdam and Southampton over 3000 tons. The steamers in transit, with the exception of two, should have arrived at Atlantic ports on various dates prior to November 24; the other two are due on December 2 and 7.

Seldom, if ever, has the New York market had conditions like the present to contend against, but while the situation is unusual and the solicitude of consumers acute, with a further advance in prices probable before substantial relief comes, the days of the corner are numbered by a few. Still, even with a more ample supply, the urgent demand for immediate delivery may hold the spot market strong, however unsettled it may become for future delivery.

Street Rails for Interurban Trolley Lines.

The engineers of the steel rail industry should lose no time in devising a rail section adapted for laying in the streets of cities which shall be suited for the heavy traffic and high speeds of the electric railroads. The astonishing growth of the electric railway, with its expansion from street lines replacing horse cars to systems rivaling in extent and importance the systems of steam railroads traversing States and connecting cities, scores, and in some instances hundreds, of miles apart, presents problems connected with the permanent way through city streets which are new and significant. The electric vehicle moving within city limits is a street car, stopping and taking on or letting off passengers wherever their convenience demands. It must be driven at a rate of speed consistent with the safety of wheeled vehicles and pedestrians; and with blockades and stops from one cause or another it cannot maintain a speed through streets from which other traffic is not excluded greater than almost any form of rail will safely accommodate. But in the open stretches of country between towns, or between cities and their suburbs, relatively high speeds are proper and necessary. For such stretches the T-rail of the steam roads is needed. It would at first glance seem a very simple matter to meet this difficulty by laying one kind of rail in the streets and another in the country, but the problem is by no means as simple as this offhand solution would suggest.

The rail adapted for use in streets is the one which offers the least resistance to the passage of ordinary wheeled vehicles over, along and across it. From this point of view the grooved girder rail, borrowed from European patterns, does very well. It is not ideal, perhaps, but as compared with the side bearing rail once generally used in Eastern cities it was extremely satisfactory. The grooved girder rail has answered its pur-

pose, but the changed conditions of electric railroad equipment and operation have demanded a new form, and nothing is offered except the T-rail of standard section. What is needed is a rail which will admit of use in streets and at the same time accommodate the flanges of the kind of wheels required for cars which are to be run at high speeds over cross country stretches of interurban railway.

This question has come up for consideration in Providence, and upon the finding of a satisfactory answer for it may depend the practicability of running into the center of the city, where passengers wish to take and leave them, the cars of the electric lines which connect Providence with a dozen places, large and small, surrounding it on all sides. As the *Providence Journal* puts it, on the matter of a fraction of an inch may depend the question whether the long distance, interurban cars intended to be run at high speeds in the open country can be brought to the centers of city traffic, or, conversely, whether the street cars can be run with safety at the high speeds desirable and permissible in the suburbs and over lines in some instances converted from steam roads. As identically the same questions are arising everywhere and constitute one of the most anxious of municipal problems, it would be difficult to exaggerate their importance in connection with the development of the electric railway along the lines of its greatest usefulness.

The discussion of the American Society of Civil Engineers has led to the conclusion that its standard rail section meets the requirements of the case most perfectly, and we have no doubt it does from the railway viewpoint. The American Street Railway Association is throwing its influence in favor of the standardizing of all railway equipment, which distinctly reflects the tendency of the times, but leaves the question of accommodating such standardized equipment equally to city and country to settle itself. It recommends the T-rail as the standard for electric permanent way, which, of course, raises the embarrassing question whether the municipal authorities are willing to permit its use in city streets. It is undoubtedly true that the T-rail makes the best track for heavy trolley cars, and that those with wheels adapted to high speeds in the open cannot be operated upon the grooved girder rails which meet the requirements of street car service. The difference lies in the width of tread and depth of flange in wheels for street and interurban traffic. Cars mounted on the narrow flanged wheels entirely suited to street traffic cannot be run as fast as it is necessary they shall be for suburban and cross country runs without constant danger of derailment. Experience in steam railroading cannot safely be departed from, especially in view of the Zossen experiments in Germany, which are intended to establish the fact that speeds of 125 miles an hour are practicable on electric lines. The competition between steam and electricity does not permit the latter to be handicapped by the necessity for restricting speeds below those at which trains drawn by locomotives can safely be run. There has been some discussion of a compromise in flange dimensions, but the patterns suggested are said to be unsuited for use in cities or out of them. What is really necessary, from the viewpoint of the electric railroad manager is that the streets he needs for his purpose shall be turned over to him to be converted into railroads, and that he shall be permitted to lay therein tracks which will be a warning to every other form of vehicle than his own cars to keep off of them. Up to the present time this is substantially the privilege he has had to use as far as his

interests required. That there is a disposition on the part of municipal authorities to curtail this privilege is due to the fact that his requirements are changing as noted, and that the streets he seeks to occupy are thereby rendered of little use to vehicles of any other form than his own cars.

We presume that the T-rail is the best rail for cars which are required to be run at high speeds outside of city limits. We may also accept the conclusion of the experts that it is the best form of rail for city streets if cars adapted to the speeds of interurban electric railroads are to be run upon them. Finally, we must remember the limitations of the rolling mills, which have probably turned rolls to every practicable section for one use or another, and have no suggestions of new forms to offer. All this being true, it occurs to us to ask whether it is not possible to use the T-rail in city streets if the surfacing of the street is done in such a way as to bring its level for wheeled vehicles up to that of the rail head. At railroad crossings it is not unusual to see the roadway built up by means of planks in such a way that wheels run over the tracks without interruption or danger, and the flanges of the car and engine wheels are perfectly accommodated. Could not the same result be attained by cast iron plates laid on either side of the rail and the surface of the street be built up to such plates, so that the shape and dimensions of the rail section would be of no consequence as affecting the convenience of street traffic? The space inside the rails in which the wheel flanges are accommodated would need to be either self cleaning by having sewer connections, which would permit the rain to wash out silt and sand accumulations, or uncoverable through the removal of the plate covering them, for purposes of cleaning by hand. This, however, presents no difficulty. The problem would appear to be a very simple one, and if the city engineers cannot solve it the railroad engineers must.

The advantages to cities of arranging to have the lines which run to the suburbs brought into their business centers is immeasurable. All classes of citizens are accommodated, and all branches of wholesale and retail trade are benefited. At the same time the streets of cities cannot be given up to railroad purposes, and the right of the citizen to their free and uninterrupted use cannot be alienated. The problem is one which would repay a liberal expenditure for its satisfactory solution, and we have no doubt it will be solved with due regard to the public interest.

Memorial Church Erected by Judge Gary.

Judge Elbert H. Gary chairman of the Board of Directors of the United States Steel Corporation, has given to Wheaton, a suburb of Chicago, one of the finest Methodist Episcopal memorial churches in America. It is erected in honor of his parents, Erastus Gary and Susanna Vallette Gary, who were among the Western pioneers.

The Gary Memorial Church is perhaps the most modern in its equipment in the West. There is a steel fire proof vault for the storing of church records and the communion service, an up to date hotel kitchen, banquet hall and dressing rooms for participants in entertainments.

In addition a nursery for babies who must be brought to church by poor mothers is provided, and a large parlor for the women with rocking and easy chairs. For the boys and young men there is a splendid gymnasium. The lantern in the tower, when lighted by electricity, can be seen in every township in Du Page County.

The building is of Gothic architecture, and is of stone, with a steel frame work. The windows are of

stained glass, the subjects being "The Three Marys at the Tomb," "Easter Morning," "The Nativity" and "The Christ Child."

New Publications.

HAND BOOK OF PRACTICAL MECHANICS. By Charles H. Saunders, Ph.B. Price, \$1. D. Van Nostrand, Publishers, New York, 1901.

This Hand Book of Practical Mechanics is intended for use in the shop and drawing office. It contains tables, rules and formulas and the solution of practical problems by quick and simple methods. The book opens with an extensive alphabetical index occupying 30 pages. In dealing with the subject of the teeth of gear wheels, diametrical pitch is defined, also arc pitch, pitch diameter, &c., and after the definition in each case there follows an example which makes the point clear. A table of diametrical pitch, with corresponding circular pitches, depth and thickness of teeth, is given, in which the thickness and depth of teeth are intended for use with the Brown & Sharpe patent cutters. The method of finding outside diameter and angles of bevel gears is exemplified with numerous formulas, also rules for calculating the strength of the teeth of gear wheels. The method of laying out involute teeth is explained, and is illustrated by an appropriate sketch. A few pages are devoted to the elucidation of logarithms, with a table of common logarithms from 1 to 100.

Problems connected with worm gear are dealt with in a number of paragraphs, which are followed by a table of natural sines, cosines and tangents.

Under the heading of Areas of Plane Figures, the triangle and circle are treated, and a table of diameter, area and circumference of circles is introduced. Among screw threads, we find, grouped together with formula, illustration and tables, the United States standard, the international or metric thread, the sharp V, the Whitworth, the British Association thread, and the Acme standard screw thread, followed by a series of tables bearing upon bolts, nuts, taps and drills. Pulleys, shafting and belting, with rules, tables and various items of useful information, succeed the consideration of screw threads, and the related subject of lathe thread cutting follows, being preceded by the rule for computing the horse-power of an engine.

The weights of iron and steel sheets, neatly tabulated, is followed by a table giving the equivalents of the United States standard gauge for sheet and plate iron and steel. A number of workshop receipts, which practical men will appreciate, are set down. United States weights and measures, the metric system, with English equivalents, weights and areas of round, square and hexagon steel, and a table of sizes and weights of square and hexagon nuts occupy adjacent paragraphs. The latter pages of the book contain various tables useful in shop and drawing office.

If there is any fault to be found in the arrangement of the various subjects dealt with, purely from a compiler's standpoint, the comprehensive index with which the book opens fully meets this criticism by furnishing the practical mechanic or draftsman with the means of turning directly to the matter with which he is concerned at the moment. The book contains information on a great variety of subjects, and with its rules, examples, tables and useful hints, should be most acceptable to those whose wants it is designed to meet. It is now in the second edition, and the author has, as he tells us, endeavored to add, in the present work, such information as has been suggested from time to time, and yet has preserved the condensed form, which readily commends it to practical men, for constant use.

ELECTRICAL DESIGNS. The American Electrician Company, Publishers, New York, 1901. Price, \$2.

Electrical Designs is a book of 262 pages, containing 34 chapters, comprising instructions for constructing small motors, testing instruments, and other apparatus, with working drawings for each design.

This book is a collection of a number of articles which have appeared in the columns of the *American*

Electrician. The contributions were from the pens of the designers of the apparatus described. They were prepared with a view of reducing to the simplest form the tools and facilities necessary for the making of the machines.

Of the 34 articles contained within the covers of this book, 13 were written by Cecil P. Poole, and comprise descriptions of how to make one-sixth horse-power motor, with drum armature, a similar motor with ring armature, both with windings for 115-volt circuit and battery current. One-fourth horse-power motor with drum, and similar machine with ring armature, with windings for 115 and 230 volt circuits and battery current. One-half horse-power motor with ring armature for similar voltage to the preceding motors. One horse-power bipolar motor with windings for 115 and 230 volt circuits. One horse-power four-polar motor with drum armature for similar voltage. Two horse-power four-polar motor with drum armature, being designs for cast iron and cast steel magnets and windings for 115 and 230 volt circuits. Two horse-power four-polar motor with drum armature, designs similar to the preceding, but for 115, 230 and 500 volt circuits. Three horse-power motor with drum armature, designs and voltage as in the preceding article.

The next in order, chapter ten, is by J. C. Brocksmith, and deals with a 1 kw. combined and direct current machine. This design contemplates working the machine *a*, as a direct current generator or motor; *b*, as a single, two or three phase generator or motor; *c*, as a rotary converter, changing single, two or three phase to direct current; *d*, as an inverted rotary converter, changing direct current to single, two or three-phase alternating currents; *e*, as a phase transformer, changing alternating current of one phase to that of any other phase.

Mr. Brocksmith also contributes chapters on designs for a 2 kw. combined alternating and direct current machine; a similar 4 kw. machine, and also a single phase rectifier.

Professor H. C. Carhart writes on the construction of a universal alternator for laboratory purposes. This is a revolving field machine from which may be taken single phase, two phase or three phase alternating currents.

P. M. Heldt, in chapter 15, describes a design of $\frac{1}{4}$ horse-power single phase induction motor.

The next two articles are by C. P. Poole. The first is on simple transformers, in four sizes, core type, with a subdivided primary winding to work on a 200, 400 or 1000 volt circuit, and subdivided secondary, from which may be taken 18, 32, 50 or 100 volts. The second article is on the construction of a reactive coil. This is a specific design, accompanied by instructions for adaptation to other conditions.

P. M. Heldt writes of the construction and calculation of rheostats, and gives rules and formulas governing the design of dynamo and motor rheostats.

Chas. T. Child gives, in chapter 19, simple voltmeters, ammeters and wattmeters, with instructions for making magnetic vane, permanent magnet and galvanometer type ammeters, a hot wire voltmeter, and dynamometer type and Aaron type wattmeters.

Chapter 20, by Edward E. Sheldon, describes the construction of a D'Arsonval galvanometer.

James F. Hobart writes of the sensitive mirror galvanometer.

H. S. Webb describes the Thompson astatic galvanometer, and in the following article the cheap testing set is explained by J. F. Hobart.

The construction and use of the photometer is discussed by Prof. A. J. Rowland.

C. P. Poole, in the next two chapters takes up the construction of a simple storage battery, and that of a constant potential arc lamp.

An experimental Nerst lamp is by W. S. Franklin, and the construction of an induction coil, by George T. Hanchett, follows.

The Tesla-Thompson high-frequency coil is described by A. F. McKissick. A chapter on the design of a condenser for extremely high potentials, and one on the con-

struction of a Winhurst influence machine, are from the pen of G. T. Hanchett.

The telephone transmitter and receiver are treated by E. E. Clement. The construction of a dry battery cell is by Townsend Wolcott, and the concluding article, forming chapter 34, is by Alton D. Adams, on some handy commutator tools.

The book has 289 illustrations, showing the various machines and parts thereof, with sizes figured. This valuable series of articles, when placed together in book form, makes a unique manual of electrical machine design, which is, as it is intended to be, thoroughly practical in its character. Tables, formulas and directions appear throughout the pages, so that the ground may be said to be very fully covered. The book is valuable to those who have the work of designing to do, as well as to those who desire a knowledge of the principles upon which correct design of electrical machines is based.

Central American Notes.

SAN JOSE, C. A., November 18, 1901.—The next two years will not only see the Isthmian Canal well under way, but the Three-Americas Railroad will have its Central American link put in as well. Chiapas, on the northern boundary, is surveying for a north and south line to reach Guatemala at or near Tapachula. Thence the line will run irregularly along the edge of the Costa Grande tableland in Guatemala, taking in Mazatenango and Escuintla. By this time two east and west lines will have been crossed—that of Quezaltenango and the Central Railway (an American line) to the capital. From Escuintla the low country of Chiquimulilla will be easy work for the engineers till the Paza River is crossed, into the republic of Salvador. If the railroad follows the more populous section of said country considerable expense will be entailed in bridges and tunnels between Sonsonate and the Lempa River. As the line skirts the lowlands of Honduras, practically uninhabited, hundreds of miles will be through dense forests of mahogany and other hard woods. Much the same country will be met with all the way through Nicaragua and Costa Rica down to Panama, although numerous small rivers will be met with which have cut deep ravines along most of their courses.

Between the canal and such a north and south railway it is impossible to imagine the great change which would take place in the five Central American republics. Still, it would be safe to predict that one respectable and responsible government would quickly be formed out of the five sections which now eye one another with jealousy. Capital has been slow to invest in the splendid opportunities offered by these countries in nearly every line—the want of stable government being the principal reason for this. But the day that sees one united republic here the producing power of the soil will be put to the test.

These countries have not the conditions for an industrial manufacturing future—all that will have to come from our nearest neighbor, the United States. Then for one coffee plant, or sugar, or mine plant now ordered for Guatemala, Nicaragua, Salvador, Costa Rica or Honduras, there will be at least 1000. I can safely predict that we shall see this very soon, because with all their faults these people are progressive in more ways than one.

c.

Cornelius Vanderbilt has obtained a patent for an improved locomotive tender. It consists of a cylindrical water tank, and on the end next the locomotive a coal box of new design. The tender runs on four wheels. The coal box will hold 7 or 8 tons. The invention, it is claimed, carries more fuel and water and costs less than the old tender.

The launch of the first iron steamer constructed in Chile occurred at Valparaiso on Sunday, November 24, and was a great success. The ceremony was attended by the President, Señor Jerman Riesco, the Federal authorities and a large assemblage of people. The entire ship, from keel to truck, was constructed in Chile.

OBITUARY.

JOSEPH W. BRITTON.

Joseph W. Britton, for many years prominently identified with the manufacturing interests of Cleveland, Ohio, died in that city on the 22d inst., aged 72 years. The cause of his death was a stroke of paralysis, which occurred several months since. Mr. Britton was born in New Hampshire in February, 1829. He removed to Cleveland in 1853, and was for a number of years with his father, one of the pioneer Western railroad builders. The Brittons built a division of the Atlantic & Great Western broad gauge railroad and a number of other lines. In the late fifties J. W. Britton, with Samuel Mather and others, established the old Cleveland Boiler Plate Mill, one of the earliest plants of its kind in the city. Later he became associated with the Cleveland Rolling Mills in Newburg, being for 11 years manager of the plate and sheet mills. Then, with Ralph Hickox, he bought back the boiler plate mills, of which he had been one of the founders, and operated the plant for a number of years under the name of the Britton Iron & Steel Company. During his early connection with this company he saw the necessity for and invented a machine for leveling sheet iron. For this invention he was awarded a gold medal at the International Inventors' Exposition, held in London in 1885. Mr. Britton continued at the head of this company until 1891, when he sold his interest in the business to

John D. Rockefeller. Meanwhile he had made, at the mills that bore his name, the first steel plates for ship building produced on the great lakes. After selling out to Mr. Rockefeller Mr. Britton established the Britton Rolling Mills, near Gordon Park, and at them made the first tin plates produced in Cleveland. When the American Tin Plate Company were formed he sold his mills to them, and since then had given his attention to mining interests in Colorado and Canada. Mr. Britton leaves a widow, five sons and three daughters.

WILLIAM BOWLER.

William Bowler, a prominent citizen and business man of Cleveland, Ohio, died on November 15, after a long illness, aged 79 years. He was born at Carlisle, Schoharie County, N. Y., and went to Cleveland in 1851. In 1863 he became interested with his brother, N. P. Bowler, in the firm of Bowler & Co., operating an iron foundry. The company later were incorporated as the Bowler Foundry Company, and Mr. Bowler continued his interest in the concern. In 1867 he organized the firm of Lord, Bowler & Co., manufacturers of machinery, from which he retired two years ago. He was also

a partner in the Cleveland jewelry house of the Bowler & Bardick Company. In 1867 Mr. Bowler was appointed by President Lincoln deputy collector of customs at the port of Cleveland. He was actively interested in many charitable and religious institutions, and erected Bowler Hall in connection with Hiram College. Mr. Bowler was married three times. His surviving son, F. W. Bowler, is secretary of the Bowler Foundry Company.

JOHN GRAFF.

John Graff, formerly a prominent figure in Pittsburgh iron manufacturing circles, died November 11 at his home in that city, aged 80 years. He was born in Westmoreland County, Pa., and entered his father's iron business in Philadelphia, where he remained until 1845, when he went to Pittsburgh, where for several years he was engaged as salesman for the firm of Graff, Lindsay & Co. Seven years later, with James I. Bennett and Robert Marshall, he formed the firm of Graff, Bennett & Co. The mills of this firm, the Clinton rolling mill and Clinton furnace, were located in the South Side. The firm were prominent for many years. Mr. Graff retired from active business in 1888. He never married.

NOTES.

EDWARD JOSLIN, a prominent manufacturer of Keene, N. H., and well known in industrial circles throughout the country, died November 21, at his home in Keene, aged 91. Mr. Joslin was one of the pioneers in the manufacture of wood working machinery in this country. In 1830, with J. A. Fay, he established the J.

A. Fay Company, now under the name of the J. A. Fay & Egan Company, with headquarters in Cincinnati, Ohio, the largest wood working machinery manufacturing company in the country. Mr. Joslin was for many years the head of the concern, directing its affairs from Keene. Death was due to old age.

WILLIAM HENRY PATTERSON, vice-president of the Illinois Car & Equipment Company, died at the New York Hospital, New York, on November 18, aged 46 years. He was born at Germantown, Pa., and was a graduate of the University of Pennsylvania, of the class of 1876.

SHERMAN L. RAYMOND, a civil engineer, died in New Orleans, November 16, aged 49. He was a graduate of the University of Virginia. He was for several years assistant United States Engineer in charge of the construction of the jetties at Saline Pass, La., a member of the Louisiana State Board of Engineers and president of the Louisiana Engineering Societies. Of late he has been engineer of the New Orleans Drainage Commission.

CAPTAIN JOHN LAWSON, who helped to build the first locomotive engine in England, and who was one of the



J. W. BRITTON.

oldest engineers in the United States, died in St. Louis, Mo., on November 21. Captain Lawson was born in Manchester, Eng., in 1805. When a boy he was apprenticed to George Stephenson, the inventor of the locomotive engine, and worked under his direction. He served as a locomotive engineer on various railroads in this country for many years, principally in the East and South. He abandoned that line of work to go into the steamboat business, in which he made a fortune.

RIBLET SNYDER, secretary of the Birch Plow Works of Crestline, Ohio, was killed on November 14, by jumping from a train.

JACOB L. LAWRENCE, of the firm of J. L. Lawrence & Sons, Sussex, N. J., died on November 22, aged 81 years. He had been engaged in the hardware and plumbing business at Newton and Deckertown, N. J., for many years.

CORYDON W. CONGER of Groton, N. Y., founder and one of the largest stockholders of the Conger Carriage Company and of the Conger Mfg. Company, and a director of the Croton Bridge Works, died on November 25, aged 76 years.

COLONEL MELVILLE SAWYER, who was for 30 years secretary of the Missouri Car & Foundry Company of St. Louis, Mo., died on November 24 at the Highland Springs Sanitarium, Nashua, N. H.

DAVID P. QUACKENBUSH, who had been in the hardware business since 1853, died suddenly at his home at Paterson, N. J., on the 23d inst., from heart failure. Mr. Quackenbush had not been in good health for the past ten years. He was born September 20, 1831. At the time of his death the firm was Quackenbush & Son.

R. D. Wood & Co., 400 Chestnut street, Philadelphia, have completed arrangements for the manufacture of "Mond gas" apparatus, by which a sufficient amount of ammonia and tar is recovered to yield a most substantial sum to be credited against the cost of the coal. The process uses bituminous slack or coal, and generates a producer gas which is known in England as "Mond gas," and which is largely used there for heating purposes and gas engines. For a ton of coal this system yields the same quantity of gas of the same heat value as in ordinary producer practice. The value of the by-products is therefore clear gain. Under favorable conditions, and with gas engines of large powers, 1 cent per day will cover the expense for fuel for 1 horse-power per day.

The Jessop Steel Company of Washington, Pa., received a charter from the authorities of Pennsylvania on the 4th inst., authorizing them to incorporate with a capital of \$250,000. Four of the incorporators are William Jessop, Sydney Jessop, Robinson Hughes and Herbert Hughes, all of Sheffield, England. The plant is now in process of construction, contracts having already been awarded for the buildings to the American Bridge Company.

A contract has been closed by the William R. Trigg Shipbuilding Company of Richmond, Va., with the Standard Oil Company for the construction of a tank steamer to carry 1,500,000 gallons of oil, and to cost \$439,000. This will be the largest vessel that has ever been built in this country for the Standard Oil Company.

The Waelark Wire Company, 49 Wall street, New York City, manufacturers of copper rods and wire, after some alterations on their rod mill at Elizabeth, N. J., which is a 16-inch train of two set and a 10-inch train of nine set, turned out on November 21 208,000 pounds of $\frac{3}{8}$ -inch rods in a run of ten hours. F. J. Reeves is foreman of the mill.

It is possible that the general offices of the Amalgamated Association, which are now in the Bissell Block, Pittsburgh, may be removed to Youngstown, Ohio. The association is recognized in but two or three of the mills in the Pittsburgh district.

The Charleston Interstate Exposition.

CHARLESTON, S. C., November 23, 1901.—The week ends with the opening of the South Carolina Interstate and West Indian Exposition only eight days off and all the builders and exhibitors on the rush. The United States Marine Corps has gone into camp on the exposition grounds for the entire exposition period. The Government fisheries exhibit has arrived and will be installed within the next few days. Nearly all the asphalt roadways in the grounds have been laid. The principal groups of statuary have been placed in the Court of Palaces.

A carload of art exhibits, valued at \$80,000, came last night and several more are on the way from Buffalo and New York. The interior of the buildings are being beautified by their rich decorations and the merchants and manufacturers of the city have declared their intention to make the opening day a public holiday. The grand parade on Monday, December 2, will be under the command of Lieut.-Col. Charles Morris of the United States Army.

A letter was received from Secretary Long to-day saying that the ships of the North Atlantic Squadron will be at Charleston as near the opening day as possible, and the great undertaking is developing into the most significant event that has taken place in the South in the last quarter of a century.

The interest in the exposition is growing steadily every day. Two or three days ago the construction of the Louisiana Purchase Company's building was begun, and the site has been finally determined upon for the Alaskan Building, and to-day the site was selected for the Cincinnati Building. The Philadelphia Building will be formally accepted by the commissioners from that city during the next few days, and the Illinois Building is ready to receive its furniture.

PERSONAL.

A. T. Shoemaker, who was for a number of years identified with the trade in the capacity of New York sales agent for the Illinois Steel Company, is now associated with the sales department of the Runskool Metal Company of 13 Cedar street, New York. The latter company produce an antifriction metal embodying the feature implied by the name of the company. G. W. Gale is president of the company, E. E. Drew vice-president, and W. N. Gale is treasurer.

H. B. Ayer of Schenectady, N. Y., has been appointed superintendent of the Manchester Locomotive Works, Manchester, N. H., succeeding the late James B. Henney.

The Louisiana Purchase Exposition Company of St. Louis have appointed Philip John Markmann mechanical engineer of the department of works. He will plan the construction details of the company's large exposition buildings. Mr. Markmann has for some ten years been a resident of Chicago, and quite a number of the important buildings erected there during that time were constructed on working diagrams made under his supervision.

A rumor to the effect that A. F. Luke will resign the treasurership of the United States Steel Corporation is officially denied.

James A. Cooper, formerly at the Youngstown Works of the National Tube Company, at Youngstown, Ohio, has resigned to take charge of the tube mill of the Youngstown Iron, Sheet & Tube Company, now building at Youngstown. James A. Hock of the Chester Works of the National Tube Company succeeds Mr. Cooper at Youngstown.

Samuel P. Harbison of the Harbison-Walker Company, fire brick manufacturers, at Pittsburgh, has given \$50,000 to the Western Theological Seminary in Allegheny, Pa.

Edward E. Slick, formerly chief engineer at the Edgar Thomson Steel Works and blast furnaces, has been made chief engineer for all the plants of the American Steel Hoop Company, and will have his offices in the Carnegie Building, Pittsburgh. The appointment goes into effect December 1. Mr. Slick is one of the youngest

engineers in the employ of the United States Steel Corporation, but has been connected with the Edgar Thomson Steel Works for about ten years.

Col. William P. Tyler, president of the Tyler Tube & Pipe Company of Washington, Pa., has returned from a six months' visit to Europe, greatly improved in health.

World's Pig Iron Record Beaten.

A new world's record for blast furnace production was made by No. 3 Furnace of the Carrie group of the Carnegie Steel Company on November 20, when 790 gross tons of basic iron was made in a 24-hour run, exceeding the best previous record, which was made by one of the Duquesne stacks of the same company, by 59 tons. The Carrie stack which made this marvelous record is one of the two new furnaces built since the Carnegie Steel Company acquired the Carrie property, both having been planned for a minimum capacity of 700 tons per day. The furnaces are 100 feet high and 23 feet in diameter in the bosh, and are equipped with 12 tuyeres. During the blast of November 20, when the great record was made, an average pressure of 21 pounds was maintained. The furnace was worked on non-Bessemer ores running from 52 to 58 per cent. in iron and 0.10 in phosphorus. Casts were made every four hours. One cast required ten ladles and yielded 168 tons. A total of 2270 tons of material was charged during the 24 hours, including 1450 tons of ores and cinder, 660 tons of coke and 160 tons of limestone. The metal was conveyed in ladles across the river to the Homestead Steel Works. No effort has been made to reach the maximum capacity of No. 4 furnace, but it is probable that the performance of No. 3 will be equaled or beaten.

A Southern Sheet Plant.

The Maryland Sheet & Steel Company is the name of a concern which took out papers of incorporation this week in New Jersey. The temporary offices of the company are given as 41 Market street, Camden, N. J. The charter permits the company to manufacture steel, sheets, &c. The capitalization is placed at \$100,000, but, according to reports, this amount will be increased. The incorporators are: Albert F. Baumgarten of Pittsburgh, Howard H. Dickey, Harry E. Weber, Robert R. Henderson and Charles E. Metz. It is understood that Philadelphia capital is backing up the enterprise. The company have purchased and will operate the plant of the Crucible Steel Company of America, at Cumberland, Md., converting it into a sheet mill, where they will make sheets from No. 14 gauge up.

Among the progressive shops in the City of Mexico are the firm of Hasam & Moreno. They are about to start a rolling mill, consisting of a 12-inch train of bar rolls to roll bars from scrap, and have decided to put in a water gas plant, using the Pettibone-Loomis system. This, through the means of gas engines and dynamos, is to place them in the position of driving their whole machine shop, &c., electrically.

The tin plate workers of the Amalgamated Association have voted almost unanimously against the proposition to have the tin plate scale hold for three years from July 1, 1901. The officials of the American Tin Plate Company have been notified of the decision, and the tin plate scale will therefore terminate on June 30, 1902.

The oil steamer "Cardium," which sailed from Port Arthur, Texas, this week, takes the first cargo of Beaumont oil to Europe. The oil was shipped by the J. M. Guffey Petroleum Company of Beaumont, owners of the great Lucas "gusher." The vessel carried 60,000 barrels of oil.

The plant of the National Tube Company at McKeesport, Pa., will be closed only 12 hours on Thanksgiving Day, owing to the fact that the mill is so crowded with orders.

MANUFACTURING.

Iron and Steel.

We are officially advised that the report that the Republic Iron & Steel Company had purchased 200,000 tons of forge iron from the Tennessee Coal & Iron Company, and had also imported some German billets, is entirely untrue. No such transactions have been made by the Republic company.

The Curtis Sheet Steel & Corrugating Company, Zanesville, Ohio, manufacturers of black and galvanized sheets and painted corrugated roofing, rolled their first sheets on October 24, and advise us they have been running two hot mills ever since, without a single break. They are also rolling their own bars, the bar mill having been started October 17, and this also has run very satisfactorily, nothing so far having been broken. They are shipping about a carload of sheets per day and have a good many orders on their books.

The Virginia Iron, Coal & Coke Company, Bristol, Va., are having a large demand for coal, coke and iron, that of coal being for home consumption and also export. They are loading at present cargoes of coal for St. George, Bermuda; Kingston, Jamaica, and Havana, Cuba. They will be shipping to Vera Cruz, Mexico, and about a month ago they made a shipment to the Philippines. Their export business in iron is limited to a few customers who use their product for special purposes. The company are now operating eight of their furnaces, two of which are running on basic iron.

The report that the Shenango Furnace Company, with offices in Pittsburgh and operating three blast furnaces at Sharpsville, Pa., making about 700 tons of iron daily, would build a steel plant at Sharpsville, is untrue.

The Knoxville Iron Company, Knoxville, Tenn., expect to break ground for the erection of their new rolling mill at Lonsdale, a suburb of that city, December 15. The plant will consist of a forge shop, 80 x 376 feet; furnace house, 68 x 220 feet, and rolling mill, 75 x 220 feet, all of steel construction; warehouse, 180 x 250 feet; machine shop, 50 x 100 feet, and gas producer house, 40 x 80 feet, all of wood construction; blacksmith shop, crusher house, brick sheds and office building. All of the machinery in the old works of modern character will be installed, with new waste heat boilers and five new gas heating furnaces. The capacity of the works will be about 50,000 tons per annum.

The W. DeWees Wood Company works of the American Sheet Steel Company, at McKeesport, Pa., was operated on Saturday night, November 23, the first time this has been done for some years. Like all other plants of the American Sheet Steel Company, this works is crowded with orders and was run on Saturday night in order to get out as much material as possible.

The report that extensive changes would be made in the finishing departments of the Edgar Thomson Steel works of Carnegie Steel Company, at Bessemer, is untrue. The works will close for a very short time only at Christmas and New Year holidays, owing to the fact that the plant is rushed with orders and it is desired to lose as little time as possible.

Furnace D of the Edgar Thomson group of the Carnegie Steel Company, at Bessemer, is out of blast and is being relined and rebuilt. The capacity of the furnace will be very much increased. One of the furnaces of the Edgar Thomson plant has been in blast for nearly eight years and in that time has made very close to 1,075,000 tons of iron. The furnace is in splendid condition, and, barring accidents, will be in blast for a long time to come. This furnace has made a wonderful record in the manufacture of pig iron, nothing like it ever having been done either in this country or on the other side.

The Labelle Iron Works, at Steubenville, Ohio, will build a new blast furnace. The new stack will be located about 30 feet in advance of the old stack, which will be dismantled. The new furnace will be 20 x 90 feet and will be equipped with four Massicks and Crookes hot blast stoves, 20 x 85 feet. The contract for the iron work of the stoves has been given to the Girard Boiler & Mfg. Company, at Girard, Ohio, while the iron work for the stack has not yet been placed. The furnace will be completed within a year.

The Brier Hill Iron & Coal Company, at Youngstown, Ohio, have given a contract to George W. McClure, Son & Co., engineers and contractors, Smith Block, Pittsburgh, for the raising of four stoves. These stoves will be raised from 65 feet to 85 feet in height, and will be done one stove at a time, so as not to interfere with the operation of the furnace.

Official advices are that the report that the Pressed Steel Car Company of Pittsburgh would be taken over by the United States Steel Corporation is untrue. At the present time the Pressed Steel Car Company are taking fully 1000 tons of plates and other shapes a day from the Homestead mills of the Carnegie Steel Company.

The United States Cast Iron Pipe & Foundry Company, 80 Broadway, New York City, have under consideration the erection of two new furnaces at Sheffield, Ala.

The Western Iron & Steel Company, Lakeview, Wash., are contemplating the removal of their plant to either Everett,

Seattle or Tacoma, Wash., and the installation of a bolt and nut machine.

The old Eagle Forge, at Rowland, Centre County, Pa., built in 1809, has been repaired and started after an idleness of 11 years. It was formerly operated for the purpose of converting the product of the Eagle Furnace into charcoal blooms. It is also calculated to reduce scrap to blooms and will probably be used for that purpose, as present prices of charcoal blooms would hardly warrant the use of cold blast charcoal in their manufacture. In 1890 the firm of Curtins & Co., who operated the furnace and forge, failed and both went out of operation. The furnace was blown in again by the Eagle Iron Company, an entirely new company, in October, 1899, and has been in successful operation ever since. The forge will not be operated by that company but by a new company who are not as yet entirely organized. We are informed that the forge is not just now in need of any equipment, but probably will be soon.

General Machinery.

A quantity of new machinery and other equipment will be required by the Lane-Bradley Company, recently organized, who are to erect and equip a large plant at Waterville, N. Y., for which no contracts have as yet been let. They will carry on a general canning and preserving business. Information concerning the company may be had from A. V. Lane, secretary and treasurer of the Kirkland Canning Company, Rome, N. Y.

The Lunkenheimer Company, Cincinnati, Ohio, have recently installed an electric traveling crane, made by the Northern Engineering Works, crane builders, Detroit, Mich. The crane is designed for floor work and is operated from the floor, replacing a hand power crane on similar duty.

The Chattanooga Machinery Company, Chattanooga, Tenn., are putting on the market a combination felloe machine for sawed felloes, which at one operation equalizes both ends of the felloe, bores both holes, and spots in both places. The machine is so arranged that it can be almost instantly adjusted to any wheel circle. The felloe is held in two clamps, which are arranged on eccentrics and can be instantly set. Saws, bits and knives are fed up to work by hand labor at the top of the machine.

Edgar A. Blenestok & Co. of St. Louis, Mo., have within the last 30 days furnished the complete equipment for four machine shops located in different sections.

No new equipment is required by the American Woodworking Machinery Company, Williamsport, Pa., who have been organized with a capital of \$1,500,000. Recently the properties of the old company were sold by the sheriff, and a committee representing the bond holders purchased the plants in Connecticut, New York, Illinois, Wisconsin and Pennsylvania, and the new company is the result. The directors are J. E. McKelvey of Rochester, N. Y.; Hiram Duryea, New York City; F. H. Clement, Rochester, N. Y.; H. C. McCormick and C. Larue Munson, Williamsport. J. E. McKelvey is president and Hiram Duryea vice-president. F. H. Clement is chief of construction.

The Connellsville Machine & Car Company, Connellsville, Pa., completed and shipped a large coke crusher for the H. R. Hackett Coal & Coke Company last week; four coal larries were sent to Alabama, two carloads of mine cars for J. R. Laughrey & Sons at the Victoria mines, and a mine cage for the Washington Coal & Coke Company. Several large steam pumps are being built and mine supply orders are being filled.

Boys, Porter & Co. of the Youghiogheny Steam Pump Works, Connellsville, Pa., have shipped to the Hecla Coke Company a mine pump that stands 30 feet in length and 10 feet high and weighs over 17 tons. The water end is built entirely of bronze, and is the second of the size furnished them recently, making six of the same size built for this company. These pumps are the largest and most expensive pumps in the Connellsville coke region. Each of the pumps has a daily capacity of 2,000,000 gallons. Boys, Porter & Co. are making daily shipments of pumps for all kinds of duty, and their works are running to their fullest capacity.

It is not likely that the new plant of the Mahoning Foundry & Machine Company at Youngstown, Ohio, which is now being erected, will be ready for operation before March 1 next. The company have been delayed a good deal in getting deliveries of machinery and other equipment.

The Modern Typewriter Company, incorporated at Albany, N. Y., recently, with a capital stock of \$1,000,000, will probably build a new works in Pittsburgh. W. H. Hays of the Iron City Tool Works at Pittsburgh has been made a director of the concern.

The Crescent Mfg. Company of Connellsville, Pa., have recently purchased valuable patents on automatic grease cups and eight lubricators for stationary engines from the Lackawanna Lubricator & Mfg. Company of Scranton, Pa.

The United Boiler & Mfg. Company, Girard, Ohio, have recently placed an order with Jos. W. Ryerson & Son of Chicago, for a Lennox bevel and rotary splitting shear. The Girard Boiler & Mfg. Company are considerably enlarging their plant and are adding a good deal of new equipment.

The Dravo Contracting Company, Lewis Block, Pittsburgh, have received the contract for the water works of the Pittsburgh

Steel Company, to be located at Monessen, Pa. The work will be completed inside of three months and will cost \$35,000. The pump house will be 30 x 100 feet and will have a height above the foundation of 57 feet, of which 27 is below the surface of the ground. It will be of concrete, and the machinery, when installed, will have a capacity of 25,000,000 gallons of water daily.

Though their requirements have not yet been determined it is probable that considerable new machinery will shortly be required by the Union Sewer Pipe Company, who are a consolidation of the John H. Rich Sewer Pipe Works and the Red Wing Sewer Pipe Company, both of Red Wing, Minn. Both of these plants are to be brought up to date in every respect by the new company, who are capitalized at \$500,000, with \$400,000 paid up. The officers are John H. Rich, president; E. H. Blodgett, vice-president; C. E. Sheldon, secretary, and H. S. Rich, treasurer.

The Lockwood Mfg. Company, East Boston, Mass., machinists and pattern makers, will enlarge their plant by the erection of an addition, to be used for setting-up purposes. No new equipment will be required.

The Bloomsburg & Sullivan Railroad Company, Bloomsburg, Pa., have let the contract to Yost & Herring for the erection of their new combined shop and engine house.

The American Machine & Foundry Company, Kingston, Pa., have enlarged the forge shop and installed a Chambersburg hammer and new Bradley forges. They are now adding 60 feet to the foundry.

Work has been started on the erection of the new plant for the Wals-King Tool Company, at Cincinnati, Ohio. It is expected that the buildings will be completed by January and ready for operation by March. The Baltimore & Ohio Railroad Company are now putting in a switch on the premises which will connect with the Cincinnati, Hamilton & Dayton and the Cleveland, Cincinnati, Chicago & St. Louis railroads.

Boilers, Engines and Accessories.

The Urle Boiler & Machine Company, Kansas City, Mo., will add a complete boiler making plant to their machine works. They will be prepared to build any style of boiler, but intend to make a specialty of the Urle patent boiler, which is specially adapted to steam and hot water heating.

New machinery will be added and the capacity of the plant doubled by the Des Moines Gas Engine Company, Des Moines, Iowa. The company, who have been operating a plant for some time, have filed articles of incorporation with a capital of \$20,000, which is considerable more than the present capital.

The Advance Mfg. Company of Hamilton, Ohio, makers of gas and gasoline engines, have in preparation the plans whereby their present capacity for the production of engines will be increased to 100 per month.

The Sintz Gas Engine Company, Grand Rapids, Mich., are building a new machine shop, 35 x 300 feet, at the Michigan Yacht & Power Company's plant at Detroit, where they will move their plant on the completion of the new building. Both companies are owned by the same parties.

The Jewell Storage Battery Company, 7 Exchange place, Boston, Mass., will next week move their plant from that city to Pittsfield, where a plant has been secured. The necessary working capital has been subscribed and the company will shortly commence the manufacture of engines, to be run by crude oil, on an enlarged scale.

The Wayne Works, Richmond, Ind., are spending about \$25,000 in improvements to their plant. A new stack is being erected, a set of 400 horse-power Sterling boilers, and a 125 horse-power engine are being installed. The engine will be used to run a dynamo and the whole shop will be lighted by electricity. Power will also be taken from it to run the machinery in the old Sedgwick building, which they recently bought. The wagon department and paint shop will be moved to the newly acquired building. No new equipment will be required for the present.

Fires.

The Clarksburg Woolen Mills, Clarksburg, W. Va., owned by Richard T. Lowndes, were destroyed by fire last week. Loss, about \$50,000.

Lura Knitting Mill, Shelby, N. C., has been destroyed by fire. Loss, \$10,000; insurance, \$6500. This plant has only been completed a few months.

The bleaching plant of the Canadian Electro-Chemical Company, Sault Ste. Marie, Mich., was burned November 24. It was owned by Philadelphia capitalists. The loss was \$75,000.

Fire November 24 destroyed the large felt plant of Julius De Long & Co. in Allegheny, Pa., entailing an estimated loss of \$60,000.

Fire, caused by spontaneous combustion, destroyed Graff Brothers' flour mill, the electric light plant, water works and telephone system at Lake Crystal, Minn., November 19. The total loss is \$100,000, one-third insured.

Fire did damage to the extent of \$40,000, November 15, at San Francisco, Cal. The loss is divided among Pickthall & Co., 105 Fremont street, the Standard Machine Works and Nugent's Wagon Works.

The packing house and office of Armour & Co. at Huntington, W. Va., were totally destroyed by fire November 22. The total loss is estimated at \$50,000.

The main building of the Bradley Fertilizer Works at North Weymouth, Mass., was destroyed by fire November 25. Loss is estimated at \$100,000, fully insured. The plant is owned by the American Agricultural Chemical Company of New York City.

The roller mill of Henry & Graham, at Tazewell, Va., was destroyed by fire November 14. The loss is about \$7000.

The Olympic Foundry, Seattle, Wash., was destroyed by fire November 13. It is understood that the plant will be rebuilt.

Foundries.

C. H. Hopke, Rockford, Ill., has leased a plot of ground on South Avon street, upon which he will erect a new foundry. The plans call for a main building, 75 x 150 feet, and a storage and shipping room 60 x 75 feet. The equipment has been purchased from the S. Obermayer Company of Cincinnati and Chicago.

The West Mansfield Foundry Company, West Mansfield, Ohio, have incorporated with a capital of \$9000. They expect to have a plant ready for operation early in the spring. The officers are S. G. Fisher, president; G. F. Plotner, vice-president; C. C. Keller, secretary, and T. F. Wilson, treasurer.

The W. J. Clark Company, Salem, Ohio, have just completed the building of a brass foundry. About seven years ago they began the manufacture in a small way of an improved hose coupling, now quite extensively known as the Quick as Wink coupler for fire, lawn and mechanical hose. The almost universal belief that the old style screw coupling could never be excelled made the introduction of the Quick as Wink coupler a hard task, but it grew in favor with fire departments steadily, though slowly, so that its superiority to the old style coupling is pretty well known. Still, the demand for them was too limited until more recently to justify installing a brass casting department. Therefore the castings for these couplers were contracted for at Pittsburgh and elsewhere. The discovery about two years ago that Quick as Wink couplers on air hose were time savers in shops where compressed air is used has increased their sales, so that they have been compelled to establish a brass foundry of their own.

Maher & Flockhart, Newark, N. J., iron founders, have purchased land on Polk street from the Star Heel Plate Company, upon which they are erecting a three-story pattern storage building, 50 x 100 feet. They are completing a cleaning room, 40 x 155 feet, which will be equipped with a 10-ton electric traveling crane, sand blast with exhaust plant complete, and pneumatic chisels.

The American Machine & Foundry Company of Kingston, Pa., contemplate an addition to their foundry.

Charles Clarage of the firm of Thos. Clarage & Son, Kalamazoo, Mich., founders and machinists, advises us that they are building their own engine, mills, &c., but will be in the market for blower and cranes within a few days. The property formerly occupied by the Den Bleyker carriage works has been purchased and a new foundry will be erected thereon. The two plants will be operated as independent companies, but it is probable that Charles Clarage, who owns a half interest in the old plant, will purchase the other half and combine the two.

Bridges and Buildings.

The Lane Bridge Company have been incorporated with a capital of \$50,000 by D. F. Lane, A. Eugene Lane and C. W. Smith. The company have purchased the bridge contracting and manufacturing business formerly conducted by D. F. Lane at Painted Post, N. Y., and are remodeling, enlarging and equipping the plant with the latest improved machinery.

Hardware.

George H. Bishop of George H. Bishop & Co., saw manufacturers, Lawrenceburg, Ind., has just returned from an itinerary among his customers, during which he visited Chicago, Milwaukee, Duluth, St. Paul, Minneapolis, Sioux City, Iowa; Omaha, Kansas City, St. Joseph, St. Louis and Louisville. Mr. Bishop states that he never saw business so good. All the small towns through which he passed showed substantial improvements, many of them installing industries. He refers to the outlook as for even a better business next year.

New machinery which will nearly double their present capacity is now being installed by the Cleveland Rivet & Forging Company, Cleveland, Ohio. This company are making a specialty of rivets and at present are hardly able to keep up with their orders.

The Boley Wire Fence Company, Sandusky, Ohio, have been incorporated with a capital stock of \$30,000. The incorporators are W. Buse, A. E. Chappelka, M. W. Boley, J. Kuebler and E. H. Penning.

Powers Bros., Henry, Ill., report constantly increasing sales of their Powers automatic chimney tops and iron mountings, on which they advise us that they have an established trade in Canada and all over this country.

Atlas Pipe Wrench Company, 121 Liberty street, New York, advise us that the sales of their pipe wrenches show a fine in-

crease during the past few months, which, they state, is doubtless chiefly due to their exhibit at the Pan-American Exposition, in which a practical demonstration was given of the workings of the wrench. They report that one of the jobbing houses in the Middle States has placed four orders for quantities of the wrench in the past 40 days, a new stock order every ten days.

Among the hardware firms who have recently installed the Warren system of hardware shelving, cabinets, cases, &c., made by John D. Warren Mfg. Company, Chicago, are the following: Schilling Bros., State Center, Iowa; Zion Co-operative Mercantile Institution, Salt Lake City, Utah; Fairfax Bros., Bristol, Tenn.; C. Newman, Hampton, Neb.; Geo. S. Orcutt, Ashland, Maine; E. G. Kerth & Co., Anna, Ill.; Levy Bros., San Mateo, Cal.; J. D. Barry Hardware Company, Clarksville, Texas; E. B. Messer & Sons, Hartley, Iowa; Mayer, Gulde & Welp, Bancroft, Iowa; Peschke & Prakel, Versailles, Ohio.

Miscellaneous.

The Hubbell-Grier Electrical Company, Bridgeport, Conn., were recently organized under the laws of New York with a capital stock of \$25,000. The officers of the company are Harvey Hubbell, president; Edward R. Grier, treasurer and manager; Francis E. Lambert, secretary. The Hubbell electrical pull specialties will be the principal product.

The Portland Woolen Mills, Portland, Ore., have increased their capital stock from \$50,000 to \$100,000. They have their new mill about completed and are now awaiting the arrival of a McCormick water wheel and some other improved woolen machinery. It is expected that the plant will be ready for operation by January. In addition to the mill the company are developing a water power plant.

The American Mfg. Company, Racine, Wis., will shortly be incorporated with a capital of \$100,000 for the purpose of manufacturing weighers and conveyers, used in the manufacture of threshing machines. They have secured the plant now occupied by the Racine Fire Engine Company, who are building a new plant at South Milwaukee, Wis., which they will equip with modern machinery as soon as the engine company move. The officers will be E. J. Gittins, president and treasurer; J. R. Harrison, vice-president, and G. N. Fratt, cashier of the First National Bank of Racine, secretary. Messrs. Gittins and Harrison were formerly with the J. I. Case Threshing Machine Company.

This week a company will be organized at Davenport, Iowa, with a capital of \$50,000, for the purpose of manufacturing a combined wire stretcher, cutter and splicer and staple puller, which is the invention of E. E. Swarm of Calamus, Iowa, to whom communications may be addressed. They expect to be in shape to do business by January.

The Prospect Brewery, Philadelphia, Pa., will build a refrigerating machine house and condenser house and make general repairs to their plant. The equipment has been bought.

The Cahill Iron Works, Chattanooga, Tenn., whose leading line of manufacture is fine plated grates and fireplaces, have erected a modern brick structure on the site of their old wooden building. They have recently commenced the manufacture of porcelain enameled goods, embracing kitchen sinks, wash stands, bathtubs, &c.

The Duff Patents Company, Empire Building, Pittsburgh, builders of the Duff water seal gas producers, will soon ship 32 gas producers of this type to the Colorado Fuel & Iron Company, at Pueblo, Col. This order was placed with the Duff Patents Company by the Garrett-Cromwell Engineering Company of Cleveland, and is one of the largest single orders for gas producers ever placed.

The Lansing Gas Light Company, Lansing, Mich., advise us that they have purchased a desirable site, but do not expect to erect a plant for at least two years.

Haak & Bro., Womelsdorf, Pa., will erect a carriage factory at that place.

The Banockburn Cotton Mills, Elberton, Ga., inform us that nothing will be done until next spring toward the extension of their plant.

The Scovill Mfg. Company, Waterbury, Conn., manufacturers of brass and German silver sheets, rods, &c., have already installed eight stands of 20-inch rolls in their new rolling mill, which was put in operation in September, and there are emplacements provided for four stands of 16-inch rolls which they expect to have in operation by February. Most of the work was built by the Bethlehem Steel Company and the engine was furnished by the Southwark Foundry & Machine Company of Philadelphia. The company at the present time are enlarging their wire mill.

The St. Albans Street Railway Company, St. Albans, Vt., have given the contract for the erection and equipment of the new car house and road to the New England Electric Railroad Construction Company.

The Deere & Mansur Company, Moline, Ill., manufacturers of agricultural implements, advise us that they will not take up any building operations until next season.

Gallup & Houghton, North Adams, Mass., will require no equipment for the 30-foot addition they are to build to their cotton mill.

The Iron and Metal Trades.

Nothing has occurred to indicate any danger of an early subsidence of the great activity which characterizes the Iron and Steel trades. Not only are more Iron and Steel now being made and consumed in the United States than at any previous time in the history of this or any other country, but members of the trade are beginning to prophesy a still larger business the coming year. The full capacity of the blast furnaces and Steel works completed and in process of erection seems to be imperatively needed to meet the requirements of the country for the greater part of the first six months of 1902. This is as far as ordinary human foresight can carry prognostications as to business. It is seldom that indications for an approaching year point so strongly to heavy trade as at the present time. Many branches of business report an unusual number of inquiries now coming up relative to material for projected improvements. It might be assumed, in view of the occurrences of the past two years, that the expansion in the American Iron trade had reached its culmination, but so far no evidence can be seen pointing to such a conclusion.

An active condition of business continues to be reported in Pig Iron, and stocks at furnaces are known to be steadily diminishing. The furnace companies are handling their business conservatively, and while they have made some slight advances, are disposed to discourage anything which might lead to speculation. This seems to be a proper policy, and is also being pursued by manufacturers of Billets and other Steel products. The scarcity in Steel continues, and undoubtedly a sharp advance could easily be sustained if manufacturers felt disposed to mark up their prices. Steel makers who for any reason have some for sale find it greedily snapped up. More business has been done in foreign Billets for importation.

While manufacturing establishments are trying to break records in endeavoring to meet the demands of the trade they are harassed by exasperating occurrences which interfere with satisfactory operations. The Coke situation has not improved as it should have done by this time, and blast furnaces are still being crippled by inability to secure fuel, a rather critical condition of affairs being reported from Chicago, where four furnaces are idle on this account, just when their production is greatly needed.

A strike of switchmen in railroad yards at Pittsburgh, while not so serious as indicated on Monday, is nevertheless interfering to a considerable extent with the operations of Iron and Steel works along some of the railroads in that vicinity.

Reports are current of another huge consolidation being contemplated in the Steel trade which proposes to take in all or nearly all of the present independent companies, but such a scheme is repudiated by representatives of several leading interests named. The consolidation of the Eastern Plate mills appears to be the only movement of importance in this direction which at present promises to be consummated.

The Scrap situation is attracting a great deal of interest. The rolling mills on the one side and the dealers on the other appear to be arranging their forces for a contest in which parties are endeavoring to control the trade in their special interests. The situation is shrouded in mystery, but it is expected that developments will shortly be made as the result of meetings which are taking place.

The interesting information reaches us from Canada that the first cargo of Canadian Pig Iron has been shipped from Sydney, Nova Scotia, to the United States, consisting of 4000 tons destined for Boston.

A Comparison of Prices.

At date, one week, one month and one year previous.

Advances Over the Previous Month in Heavy Type.
Declines in Italics.

	Nov. 27, 1901.	Nov. 20, 1901.	Oct. 30, 1901.	Nov. 21, 1900.
PIG IRON:				
Foundry Pig, No. 2, Standard, Philadelphia	\$15.50	\$15.50	\$15.00	\$15.50
Foundry Pig, No. 2, Southern, Cincinnati.....	14.25	14.25	13.75	13.50
Foundry Pig, No. 2, Local, Chicago	15.00	15.00	14.75	14.50
Bessemer Pig, Pittsburgh.....	16.00	16.00	16.00	13.75
Gray Forge, Pittsburgh.....	14.75	14.50	14.10	13.25
Lake Superior Charcoal, Chicago..	17.00	17.00	17.00	18.00

BILLETS, RAILS, ETC.:

Steel Billets, Pittsburgh (nom)....	27.00	27.00	27.00	19.75
Steel Billets, Philadelphia (nom)...	29.00	29.00	28.00	21.00
Steel Billets, Chicago, (nom).....				20.75
Wire Rods (delivered).....	35.50	35.50	35.00	33.00
Steel Rails, Heavy, Eastern Mill..	28.00	29.00	29.00	26.00
Spikes, Tidewater.....	2.00	1.80	1.80	1.50
Splice Bars, Tidewater.....	1.65	1.50	1.50	1.35

OLD MATERIAL, PER GROSS TON:

O. Steel Rails, Chicago.....	14.00	14.00	14.00	11.00
O. Steel Rails, Philadelphia.....	17.50	17.25	17.25	15.50
O. Iron Rails, Chicago.....	21.00	21.50	21.00	17.50
O. Iron Rails, Philadelphia.....	21.50	21.80	21.00	17.50
O. Car Wheels, Chicago.....	15.50	15.50	16.00	16.00
O. Car Wheels, Philadelphia (nom)...	16.00	16.00	15.00	16.50
Heavy Steel Scrap, Chicago.....	13.50	13.50	13.50	10.00

FINISHED IRON AND STEEL, PER POUND:

Refined Iron Bars, Philadelphia...	1.65	1.62½	1.65	1.40
Common Iron Bars, Chicago.....	1.65	1.65	1.70	1.55
Common Iron Bars, Youngstown..	1.55	1.55	1.55	1.35
Steel Bars, Tidewater.....	1.70	1.70	1.62½	1.35
Steel Bars, Pittsburgh	1.50	1.50	1.55	1.30
Tank Plates, Tidewater.....	1.75	1.75	1.75	1.50
Tank Plates, Pittsburgh.....	1.60	1.60	1.60	1.35
Beams, Tidewater.....	1.75	1.75	1.75	1.65
Beams, Pittsburgh.....	1.60	1.60	1.60	1.50
Angles, Tidewater.....	1.75	1.75	1.75	1.55
Angles, Pittsburgh.....	1.60	1.60	1.60	1.40
Skelp, Grooved Iron, Pittsburgh..	1.80	1.80	1.80	1.55
Skelp, Sheared Iron, Pittsburgh ..	1.85	1.85	1.85	1.55
Sheets, No. 27, Pittsburgh.....	3.00	3.00	3.00	2.80
Barb Wire, f.o.b. Pittsburgh.....	2.90	2.90	2.90	2.80
Wire Nails, f.o.b. Pittsburgh.....	2.15	2.15	2.25	2.30
Cut Nails, Pittsburgh.....	2.05	2.05	2.05	1.05

METALS:

Copper, New York.....	16.75	16.85	16.85	16.75
Spelter, St. Louis	4.15	4.12½	4.12½	4.15
Lead, New York.....	4.37½	4.37½	4.37½	4.37½
Lead, St. Louis.....	4.25	4.25	4.25	4.22½
Tin, New York.....	33.00	37.10	34.85	28.50
Antimony, Hallett, New York....	8.87½	8.37½	8.50	9.50
Nickel, New York.....	90.00	90.00	90.00	55.00
Tin Plate, Domestic Bessemer, 100 lbs., New York.....	4.19	4.19	4.19	4.19

Chicago.

FISHER BUILDING, November 27, 1901.—(By Telegraph.)

Production of Pig Iron in this district has been seriously curtailed by the Coke famine. One of the two furnaces idle a week ago from this cause has resumed, but three others have been compelled to close down, making four now idle. Prospects for resumption are as uncertain as a week ago. All that can be said is that the immediate outlook is unfavorable. Five thousand tons of Pig Iron a week are thus withdrawn from this market, at a time when greatly needed. Great pressure for relief has been brought to bear upon the railroads, but so far without success. It seems to be a physical impossibility to bring the Coke forward. The local Plate mills also have closed temporarily. They will be repaired and probably will reopen next week. The Plate trade is the only branch that would at present permit of the slightest suspension of activity. Demand in other lines keeps considerably ahead of supply. Billets, Rods, Bars, Rails and Structural Material are sold so far ahead that a suspension of producing activities would be in the nature of a calamity. New business this week has been moderately good, larger than customary at this time of year.

Pig Iron.—It is said on railroad authority that lines north of the Ohio River will about January 1 advance the freight rate on Pig Iron 25c. a ton. This will make

the Birmingham-Chicago rate \$3.85, and will restore the rate in force in 1900. The general impression is that the big buying for the first half of the year is over. This view is entertained by some Pig Iron sellers from the fact that their output during that period has been quite thoroughly sold. Some makers are practically out of the market, but there remain a considerable number of the smaller melters who have not covered their wants much, if any, beyond January 1. There is a fair trade this week, largely for quick shipment in small lots, but with an occasional transaction running up to about 1000 tons for shipment well into 1902. But the present situation is mainly one of delivery. The closing down of furnaces unexpectedly, putting out of this market about 5000 tons of Pig Iron a week, which had been sold and was depended upon for delivery, has resulted in a scarcity of stocks, which is making shipments on old contracts in some instances quite slow. Prices of Southern products are further strengthened by the application of the price for Birmingham Iron to other districts. Prices as corrected are as follows:

Lake Superior Charcoal.....	\$17.00 to \$18.00
Local Coke Foundry, No. 1.....	15.50 to 16.00
Local Coke Foundry, No. 2.....	15.00 to 15.50
Local Coke Foundry, No. 3.....	14.50 to 15.00
Local Scotch, No. 1.....	15.50 to 16.00
Ohio Strong Softeners, No. 1.....	17.25 to 17.50
Southern Silvery, according to Silicon.....	16.15 to 16.40
Southern Coke, No. 1.....	15.65 to 16.15
Southern Coke, No. 2.....	15.15 to 15.65
Southern Coke, No. 3.....	14.65 to 15.15
Southern Coke, No. 1 Soft.....	15.65 to 16.15
Southern Coke, No. 2 Soft.....	15.15 to 15.65
Foundry Forge.....	14.15 to 14.65
Southern Gray Forge.....	14.15 to 14.65
Southern Mottled.....	14.15 to 14.65
Southern Charcoal Softeners, according to Silicon.....	15.00 to 16.00
Tennessee Silicon Pig.....	16.40 to 16.65
Alabama and Georgia Car Wheel.....	19.50 to 20.50
Malleable Bessemer.....	16.00 to 16.25
Standard Bessemer.....	..... to 17.50
Jackson County and Kentucky Silvery, 8 per cent. Silicon.....	16.00 to 16.25

Bars.—Makers of cars have inquired for a large tonnage of Bars. Otherwise the market is without decided change. Demand for Steel Bars may be slightly more active, but the inquiry for Iron Bars in small lots is moderate. However, the buyers of months ago are specifying promptly on their contracts and the rush of product from mill is unabated. Prices are unchanged at 1.65c. for both Iron and Steel from mill. Quotations from stock are unchanged at 2c. for Common Iron, and 1.90c. to 2c. for Steel Bars, and 2.50c. for Steel Hoops.

Structural Material.—The building outlook locally is looking up. The contract has been let for the Powers Building, to be erected at the corner of Wabash and Monroe streets. It will require about 1200 tons of Shapes. Several other structures of considerable size are talked of and for quick shipment there continues difficulty in procuring Shapes, especially for Angles, the demand for which from various sources is remarkably large. Mill shipments are quoted as follows: Beams, Channels and Zees, 15 inches and under, 1.75c.; 18 inches and over, 1.85c.; Angles, 1.75c. rates; Tees, 1.80c.; Universal Plates, 1.75c. to 1.85c.; small lots of Beams and Channels from local yards are quoted at 2.25c.; Angles, 2c. rates; Tees, 2.15c.

Plates.—The local mill is closed owing to a scantiness of specifications and orders. This is due to special causes, which do not involve market conditions. Taking advantage of the situation, repairs are in progress, which may make unnecessary a suspension of activities later. The consumption of Plates is satisfactory for this time of year. Mill shipments are quoted as follows: Tank Plate, ¼-inch and heavier, 1.75c. to 1.80c., Chicago; Flange, 1.85c.; Marine, 1.95c. Jobbers are selling small lots from store at 1.90c. to 2c. for Tank, and 2.25c. for Flange, with the usual extras for heads, segments, lighter gauges, &c.

Sheets.—There is some guessing as to what effect the opening of new mills early in the coming year will have upon prices, but even with this in prospect business continues very active. There is difficulty in obtaining spot deliveries on some sizes and prices are without quotable change, though fluctuating, No. 27 Common ranging from 3.50c. to 3.70c., from store, and Galvanized from 65 and 10 to 70.

Merchant Pipe.—There is an excellent local trade

from store, due largely to late building operations. Country business is receding in volume. Carload lots are now quoted as follows, random lengths: Black, ½ to ½ inch, 60 off; ¾ to 10 inches, 67 off; Galvanized, ½ to ½ inch, 47 off; ¾ to 6 inches, 55 off.

Boiler Tubes.—Trade in Boiler Tubes continues good, with no change in prices. Quotations are as follows:

	Steel.	Iron.
2¼ to 5 inches.....	57½	47½
1½ to 2½ inches.....	50	40
1 to 1½ inches.....	35	30
6 inches and larger.....	52½	45

Rails and Track Supplies.—Less buying is to be noted this week in both Light and Standard Sections, but the output of Light Rail mills has been engaged into next year and inquiries favor a resumed buying movement for spring delivery. For Standard Sections there is a fair trade. Standard Sections are firm at \$28, and Light Rails are slightly higher at \$30.50 to \$35. Track Fastenings are active and strong. They are quoted as follows: Splice Bars, 1.65c. to 1.75c.; Spikes, 2c. to 2.10c.; Track Bolts, with Hexagon Nuts, 2.90c. to 2.95c.; Square Nuts, 2.75c. to 2.80c.

Merchant Steel.—A few transactions involving the wants of large consumers have been closed, but present and prospective inquiry seems to point mainly to the smaller consumers, who have been skeptical about published trade accounts of activity and are asking for early deliveries. Disappointment and chagrin are their lot, for the mills are sold far into the future. Mill shipments, Chicago, are quoted as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.85c. to 2c.; Open Hearth Spring Steel, 2.30c. to 2.40c.; Toe Calk, 2.40c. to 2.60c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 55 off in carload lots. Ordinary grades of Crucible Tool Steel are quoted at 6¼c. for carloads and 7c. to 7½c. from store; Specials, 12c. upward.

Old Material.—Some deals have been closed in Old Material at prices above those quoted. The buying was to cover short sales made some time ago before the attitude of consumers developed into so great resolution. Mills are buying fairly good tonnages at the quotations previously named, but the market is not especially active. It is noted, however, that all along the line from the consumer back to the maker bids for Scrap have taken a lower range than a month ago. The following are approximate quotations per gross ton:

Old Iron Rails.....	\$21.00 to \$21.50
Old Steel Rails, mixed lengths.....	14.00 to 14.50
Old Steel Rails, long lengths.....	18.00 to 18.50
Heavy Relaying Rails.....	25.50 to 26.00
Old Car Wheels.....	15.50 to 16.00
Heavy Melting Steel Scrap.....	13.50 to 14.00
Mixed Steel.....	10.50 to 11.00

The following quotations are per net ton:

Iron Fish Plates.....	\$16.50 to \$17.50
Iron Car Axles.....	20.00 to 21.00
Steel Car Axles.....	18.00 to 18.50
No. 1 Railroad Wrought.....	15.00 to 15.50
No. 2 Railroad Wrought.....	13.25 to 13.75
Shafting.....	16.00 to 16.50
No. 1 Dealers' Forge.....	13.00 to 13.50
No. 1 Bushing and Wrought Pipe.....	11.50 to 12.00
Iron Axle Turnings.....	11.25 to 11.75
Soft Steel Axle Turnings.....	10.50 to 11.00
Machine Shop Turnings.....	9.50 to 10.00
Cast Borings.....	5.00 to 5.25
Mixed Borings, &c.....	5.25 to 5.50
No. 1 Bolders, cut.....	11.00 to 11.50
No. 2 Bolders, cut.....	10.00 to 10.50
Heavy Cast Scrap.....	11.00 to 11.50
Stove Plate and Light Cast Scrap.....	8.00 to 9.00
Railroad Malleable.....	12.50 to 13.00
Agricultural Malleable.....	11.50 to 12.00

Metals.—There is steadiness in the local Metal markets, except in Tin, which, in harmony with Eastern prices, is much higher. Copper is moving somewhat cautiously but in good volume. Lead is moderately active. Carload lots of Lake are held at 17c., and Casting brands at 16¼c. Pig Lead stands steadily at 4.32½c. for Desilverized and 4.42½c. for Corroding, in 50-ton lots. Dealers continue to quote selling prices on small lots of Old Metals as follows: Copper Wire and Heavy, 15c. to 15½c.; Copper Bottoms, 14c.; Pipe Lead, 4.15c.; Zinc, 2.75c.

Coke.—The Coke situation is occasioning serious alarm. There is extreme shortage and large shippers are not able to fill their contracts. Some small lots of free Coke are arriving, which command fancy prices, quotations being heard as high as \$6. But there is not

enough of this free Coke to help out where it is needed most. Connellsville Crushed is still sold on contract at unchanged prices, \$5 being a common figure.

Philadelphia.

FORREST BUILDING, November 26, 1901.

There is not much change to report this week, practically no change at all. The prominent features noted in our last report are the prominent features now, and there is nothing to indicate anything different in the near future. General business is in excellent shape, and it is quite safe to say that a great deal more Iron and Steel is being made and consumed in the United States to-day than at any previous time in the history of this or any other country. Moreover, the outlook even from the most conservative point of view favors the expectation of a still larger business during the coming year. After such a tremendous forward movement as there has been during the past two or three years, it might naturally be assumed that the expansion had about reached its culminating point, but there are no indications of that kind, but the reverse. As a matter of fact, and putting aside preconceived ideas of what one might suppose ought to be, the immediate conditions favor the expectation of permanency, even if there be no further increase in the volume of business. But it is impossible to size things up with any degree of confidence, all that any one can say with certainty is that the production and the consumption exceeds all former records, and that for the present there is not the slightest indication of anything less favorable in the near future. Prices, however, seem disposed to rest at the prevailing level, and in view of the constantly increasing capacity for production, it is considered good policy to work on conservative lines.

Pig Iron.—It does not require many words to cover the entire ground. Metal for prompt delivery is scarce, and prices are close to the highest of the entire year, although about \$1 per ton would cover the entire range during the past 11 months. It is a remarkable fact that with a production of over 15,000,000 tons for the year prices are likely to close in December just about as they opened last January. A drop of 75c. to possibly \$1.25 per ton as an extreme figure occurred between the dates mentioned, which, in view of the immense tonnage, is a most remarkable feature. The situation at the present time is under the complete control of producers, and it would probably be an easy matter to advance prices if they so desired, but there is a disposition to avoid premature action, particularly as this is the time of year when everybody wants to take new soundings. If a further advance is warranted and seems likely to be maintained, it can easily be made later on, while a premature movement might cause a good deal of trouble. As regards the business of the past week, it may be said to have been entirely satisfactory. A considerable amount of Iron has been taken for the first three and the first six months of the coming year, but a good many buyers are taking their chances under the idea that they will not be called upon to pay more, and may get in at a little less than to-day's figures. The feeling is about evenly divided, so that a little more business or a little less might determine the course of the market for several weeks to come, but there are very few who expect anything on either side of the market beyond a 25c. movement, or at the most, 50c. Prices to-day are just about as they were a week ago, the undertone being decidedly firm at the following figures for Philadelphia and nearby deliveries, and about 25c. less for deliveries within a radius of 100 miles south or west: No. 1 X Foundry, \$15.75 to \$16; No. 2 X Foundry, \$15.50 to \$15.75; No. 2 Plain, \$15 to \$15.25; Standard Gray Forge, \$14.25 to \$14.50; Ordinary Gray Forge, \$13.50 to \$13.75; Basic (Chilled), about \$14.25, and Bessemer at \$15.75 to \$16.

Muck Bars.—A good business is being done at prices around \$28 f.o.b. cars, seller's mill. A lot of 3000 tons was sold at about 50c. less money.

Billets.—The scarcity is still very great, and prices for early deliveries are hardly quotable, as there are

very few for sale at any price within reason. German Steel is being figured on, however, and it is understood that about \$27 delivered on dock is quoted for ordinary sizes of Soft Steel.

Plates.—Some good sized orders have been placed during the week, and while there is no great rush the mills are very comfortably employed. No definite announcement has been made in regard to the consolidation of some of the Eastern mills, but there is good reason for believing that the deal will be closed in course of a few days. Meanwhile, prices remain as last quoted for Philadelphia and nearby deliveries: Universals, 1.75c. to 1.80c.; Sheared, 1.75c. to 1.80c.; Flange, 1.85c. to 1.95c.; Fire Box, 1.95c. to 2.05c.; Marine, 1.95c. to 2.05c.; C. H. No. 1 Iron, \$2.40c.; C. H. No. 2 Flange, 2.90c.; C. H. No. 1 Flange Fire Box, 3.40c.

Structural Material.—There is no change in this department, the scarcity for prompt deliveries continues, and prices are at more or less of a premium, according to circumstances. Prices nominally as follows for seaboard or nearby deliveries: Angles, 1.75c. to 1.85c.; Beams and Channels, 15-inch and upward, 1.75c. to 1.85c.

Bars.—There is a good deal of irregularity, owing to some of the outside mills quoting about \$1 per ton less than association prices. As a consequence some mills are busy, while others are on short time, although the aggregate tonnage is very large. Deliveries are readily obtained, however, and the general appearance of the market is rather "spotty." Steel Bars are scarce at 1.70c. to 1.75c., Iron Bars at 1.65c. to 1.67½c.

Sheets.—There is a good demand, and mills are still unable to make deliveries as promptly as required. Prices are easier, however, and for long deliveries would be quoted about as follows (Common Sheets two-tenths less): No. 10, 2.30c. to 2.40c.; No. 14, 2.50c.; No. 16, 2.70c.; Nos. 18-20, 3.20c.; Nos. 26, 27, 3.50c. to 3.60c.; No. 28, 3.80c. to 4c.

Old Material.—There is a heavy demand, and prices are a turn dearer. Bids and offers for deliveries in buyers' yards are as follows: Low Phosphorus Scrap, \$21.50 to \$22; Choice Railroad Scrap, \$20 to \$21; Country Scrap, \$16 to \$17; No. 2 Light (Ordinary), \$12.50 to \$12.75; No. 2 Light (Forge), \$14 to \$14.75; Machinery Cast, \$14 to \$14.50; Heavy Steel, \$17.50 to \$18; Old Steel Rails, short lengths, \$17.50 to \$18; Old Iron Rails, \$21.50 to \$22; Wrought Turnings, \$12.75 to \$13.25; Cast Borings, \$8 to \$8.25; Old Car Wheels, \$16 to \$16.50; Iron Axles, \$24 to \$25; Steel Axles, \$19 to \$20.

Cleveland.

CLEVELAND, OHIO, November 26, 1901.

Iron Ore.—It is now down to the point where the shippers are about to clean up their Iron Ore business for the year and go off of the market. The cargoes are obtained from the upper lake district with the utmost difficulty, all of the pockets being frozen, necessitating that all Ore be thawed with steam. What little Ore is moving is being brought down the lakes in vessels which the shippers have under contract or own themselves, hence but little chartering is being done. The amount remaining to be shipped is so slight that the Steel Corporation sent some of their boats after coal and grain this last trip, and will keep them there until the end of the season, which is not far off. During the week reports were heard that Ore charters out of Escanaba had been made at \$1, but this proved to be erroneous, as a few boats were loaded, and the best rate obtained was 90c. Out of Duluth the shippers are paying only \$1.25, despite advances in other lines, and \$1.15 is the nominal rate from Marquette. The dispatch at the lower lake docks is fair only, yet better than it has been of recent weeks because the Coal shippers are turning over more empty cars.

Pig Iron.—The market is very strong in the Pig Iron trade, and while nothing in the way of better prices has appeared there is an upward tendency. This is notably true in the Foundry grades, some of the smaller consumers getting pinched because they did not place contracts. Some of those whose needs are irregular, and who de-

pend upon the market at the time their needs appear, are finding now that the furnaces are out of material for quick shipment. Some such buyers are going to the jobbers, and are paying premiums for the material they need. Generally, however, Foundry Iron is off of the market for quick shipment, and it is even reported that the supply is getting short for contracts covering a period well on into the second quarter. The prices do not change, being strong at \$14.50 in the Valley for No. 2 Southern Foundry. No. 2 is still being quoted in this territory at \$11.50, Birmingham, plus the \$4.70 rate of freight for a Cleveland quotation, and it is reported that some sales have been made. In the Basic trade a little Iron has been sold, which will be delivered through January and February. This has been mostly to small buyers, and the contracts have hardly amounted to enough yet to permit of a quotation of the price for the first quarter of the year. However, it is taken as an indication of what is likely to occur when the information is given that these smaller sales have been made on the basis of \$15 in the Valley. So far none of the big buyers has taken any material either of the Bessemer or Basic grade. Many of the Basic furnaces are out of blast, due to the absence of Coke, and some are making repairs, among them being the Struthers, which is being relined and is having some additions put to it, but nothing in the way of a general rebuilding such as was suggested here last week. Some Iron for Malleable purposes has been sold in 1000-ton lots in the Valleys recently at \$15.50. The price of Bessemer has not been fixed, but the Bessemer Association is demanding that nothing less than \$15.25 be accepted. It is possible that \$15.50 in the Valley may be settled upon. Deliveries of all grades are still being hindered by the scarcity of cars.

Finished Material.—The story of the Finished Steel trade is one of continued great activity. The orders are still coming in with such persistency that mills are constantly behind with deliveries, and the contracts have also been coming in until the possible output of the mills has been anticipated for months to come. Just now the mills are being harassed by a shortage of cars, and it has been said that unless there is some relief immediately the mills in certain sections will have to shut down, as there will be no room left for the storage of the material. The car supply is so short now that not much more equipment is furnished than will meet the demands of the mills for handling their business between the various plants. Some relief is looked for following the close of the season of navigation. In the Rail trade the boom is still on, and the buying has been done from this territory this week for material which is to be delivered through the fourth quarter of next year. The price holds at \$28. In Structural Material the prospective purchaser has found that there is no material available before March 1, and has placed contracts already which cover his needs during the first half of next year. The prices hold firm at 1.70c. In Sheets the gauges between 12 and 20 are very hard to find, with deliveries not promised surely inside of six weeks, and in some instances in much longer time. The prices do not vary much. In Bars the demand for the material is increasing, and the business seems to be growing instead of falling away any. It is now assured that the demand will be equal to the greatly increased production, and some of the mill men are greatly relieved. Some sizes are even hard to find, and the market is strong. There is certainly no manifest desire to break down the prices any, because the trade is so active. It might be said also that the market is hardly strong enough to warrant an advance. Bar Iron is bringing 1.50c., Pittsburgh, and Bessemer Bar Steel is quoted at 1.50c., Pittsburgh, with Open Hearth Bar Steel at 1.60c., Pittsburgh. The demand for Steel Plate is still on the increase, and the market is now stronger than it has been for weeks. In fact, conditions all told are most hopeful from the standpoint of the producer, and the comment most frequently heard is that the prospects for a slump away from the prevailing conditions are very remote.

Old Iron.—The Scrap trade this week has been moving along easily and steadily, with no great sales. Neither was any weakness apparent. There is an immediate de-

mand for all material that presents itself, and the dealers turn over their purchases quickly. The prices hold as follows: No. 1 Wrought, \$16.50 net; Cast Borings, \$8 gross; Wrought Turnings, \$12.25 gross; Cast Scrap, \$13 net; Stove Plate, \$10 net; Heavy Steel, \$17 gross; Steel Rails, \$17 gross; Old Iron Rails, \$22 gross; Old Iron Axles, \$19 gross; Old Car Wheels, \$17 gross.

Cincinnati.

FIFTH AND MAIN STS., November 27, 1901.—(By Telegraph.)

There has been a very good run of trade in Pig Iron circles throughout the past week. Most of the tonnage is for the second quarter next year delivery. The current inquiry bespeaks a continuation of the present activity. Quotations for Southern Irons are unchanged, and, when the quality is taken strictly into consideration, there is but one basis upon which to figure. The prices on Lake Superior Coke brands were advanced to preserve the same relation to Southern Iron as formerly. The situation is exceedingly strong, and while a conservative spirit is evident, yet it looks as though there would be further advances before the prevailing activity ceases. The scarcity of cars is still causing considerable annoyance. Freight from Birmingham is \$2.75 to this point; from Hanging Rock district \$1.10. We quote, f.o.b. Cincinnati:

Southern Coke, No. 1.....	to \$15.00
Southern Coke, No. 2.....	to 14.25
Southern Coke, No. 3.....	to 13.75
Southern Coke, No. 4.....	to 13.25
Southern Coke, No. 1 Soft.....	to 15.00
Southern Coke, No. 2 Soft.....	to 14.25
Southern Coke, Gray Forge.....	to 13.25
Southern Coke, Mottled.....	to 13.25
Ohio Silvery, No. 1.....	\$15.35 to 15.85
Ohio Silvery, No. 2.....	14.85 to 15.35
Lake Superior Coke, No. 1.....	15.85 to 16.35
Lake Superior Coke, No. 2.....	15.35 to 15.85
Lake Superior Coke, No. 3.....	14.85 to 15.35
Southern Basic.....	to 14.75

Car Wheel and Malleable Irons.

Standard Southern Car Wheel, chilling grades.....	\$18.25 to \$18.75
Standard Southern Car Wheel, No. 2.....	17.25 to 17.75
Lake Superior Car Wheel and Malleable.....	18.50 to 19.00

Plates and Bars.—On an unchanged basis the market is showing considerable activity and the tone is stronger. Prices are at least nominally the same. Iron Bars have been placed on the same basis as Steel Bars and are quoted f.o.b. Cincinnati as follows: Iron Bars in carload lots, 1.60c. to 1.65c., with half extras; same in small lots, 1.65c. to 1.80c., with full extras. Steel Bars are same price as Iron Bars. Base Angles, in carload lots, 1.90c.; Plates, ¼-inch and heavier, 1.90c. to 2c.; 3-16 inch, 2.10c.; Sheets, No. 16, 2.90c. to 3c.

Old Material.—The market is strong and reasonably active. We quote dealers' buying prices, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, per net ton, \$14 to \$14.75; Cast Railroad and Machine Scrap, \$12.25 to \$12.75; Iron Axles, \$19 to \$20; Iron Rails, \$17.25 to \$18.25; Steel Rails, rolling mill lengths, \$14.75 to \$15.25; short lengths, \$13.75 to \$14; Car Wheels, \$16 to \$17. All prices except No. 1 Wrought on the basis of gross tons.

St. Louis.

CHEMICAL BUILDING, November 27, 1901.—(By Telegraph.)

Pig Iron.—Conditions in the Pig Iron market continue along about the same lines as last reported. A very good and steady demand ruling, with no marked let up on account of the recent advance. No large orders come to light this week, single lots of 500 tons being about the heaviest that can be noted. It is remarked that with stocks on hand at the furnaces so fast diminishing it looks as if the ones whose requirements are not covered well ahead might experience some difficulty in the near future. The Coke supply among the Southern furnaces seems to be causing considerable uneasiness, and while it has not assumed a very serious phase the railroads do not seem to be in any better condition to meet heavy requirements for cars at this time. We quote as follows for cash, f.o.b. St. Louis:

Southern, No. 1 Foundry.....	\$15.50 to \$15.75
Southern, No. 2 Foundry.....	14.75 to 15.00
Southern, No. 3 Foundry.....	14.25 to 14.50
Southern, No. 4 Foundry.....	13.75 to 14.00

No. 1 Soft.....	15.25 to 15.50
No. 2 Soft.....	14.75 to 15.25
Gray Forge.....	13.75 to 14.00

Bars.—Nothing new is to be announced regarding the tendencies of the market for Iron and Steel Bars and the mills report a very strong and active demand. Among the jobbers a slight slackening in the demand is to be noted. We quote, from mill, Iron Bars at 1.70c. to 1.80c., Steel Bars at 2c. Jobbers quote Iron Bars at 2c. to 2.10c.; Steel at 2.10c. to 2.15c., full extras.

Rails and Track Supplies.—The Rail department of the market is without special incident since our last report, but a very heavy business can be reported. Heavy demand and a very satisfactory inquiry are the factors to be noted in the market for Track Supplies. Prices hold firm at recent figures. We quote: Splice Bars, 1.75c. to 1.95c.; Bolts, with Square Nuts, 2.75c. to 2.90c.; with Hexagon Nuts, 2.90c. to 2.95c.; Spikes, 2c. to 2½c.

Angles and Channels.—The demand and inquiry for Small Angles and Channels is said to be somewhat lighter, but is very satisfactory for this season of the year, and 2.30c., base, is the price named by jobbers for materials of this class.

Sheets.—A very fair volume of business is reported in the market for Sheets of all classes and sizes, and in certain grades a shortage seems to be more evident. Jobbers quote Stove Pipe size, No. 27, 3.45c. to 3.50c.; Galvanized Sheets, 65 and 10 off, and in round lots 70 to 70 and 5 off.

Pig Lead.—The Pig Lead market continues quiet, without any change to be noted in the volume of demand or prices. Soft Missouri at 4.25c. to 4.27½c., and Chemical at 4.30c. to 4.35c.

Spelter.—A firmer tendency is to be noted in the Spelter market. The fact of the production of the smelters being sold well ahead is brought out more forcibly from day to day. It is pointed out right now that production does not seem equal to demand, and higher prices look inevitable. Active bidding at 4.15c. is now going on.

Pittsburgh.

HAMILTON BUILDING, November 27, 1901.—(By Telegraph.)

Pig Iron.—Many consumers are in distress for Pig Iron, the furnaces not being able to get cars to ship out their Iron as fast as needed by their customers, and the result is a good deal of Iron is piled up in the furnace yards. The situation in Pig Iron is very strong and prompt metal is bringing from 25c. to 50c. a ton premium. The United States Steel Corporation have bought 5000 to 6000 tons of Standard Bessemer recently for December shipment, making close to 50,000 tons the corporation have bought for shipment next month. The price of all this Iron was \$15.25, at furnace, which is the regular price for Standard Bessemer. It is a fact that \$15.50 and even \$15.75 has been paid for small lots of Bessemer and Basic Iron where the seller would agree to ship out right away. These prices, however, are above the regular market, and are made possible only by the scarcity of Iron for spot shipment. One Steel plant has paid about \$15.75 for prompt Basic Chilled Iron. There is a good demand for Forge, and the market is strong at about \$14 at furnace or \$14.75 Pittsburgh. No. 2 Foundry Iron for prompt delivery has sold at \$15.75 to \$16, Pittsburgh, for small lots. On contracts for next year's delivery No. 2 Foundry is \$15.50 to \$15.75, and No. 1, \$16 to \$16.50, Pittsburgh.

Steel.—All sorts of prices are heard of for Billets, and the market is very difficult to accurately quote. Bessemer Steel, ordinary specifications, and for reasonably prompt shipment has sold at prices ranging from \$27 to \$28, and higher at buyer's mill. It is reported that Steel has been offered at about \$25 on contracts for delivery in the first quarter and first half of next year, but we have not been able to verify this. The leading Steel interest is reported to be out of the market at present as a seller. Sheet Bars for prompt delivery have sold at prices ranging from \$31 and up to nearly \$32, f.o.b. cars, Pittsburgh. Small Billets in small lots and for prompt shipment have sold at about the same price.

(By Mail.)

The Iron trade is still suffering from the car shortage and last week the situation in this respect could hardly have been worse. Large Steel concerns, making 500 tons a day or more, did not receive a single car in 48 hours. The railroad people claim to be doing all they can to relieve the situation, but there is no doubt but that a woful lack of cars and a greater lack of motive power exist. However, the situation will likely improve within the next week or ten days, owing to close of navigation, which will release a good many cars that have been engaged in the Ore trade. The Iron trade is without special feature this week. There is a great scarcity of both Pig Iron and Steel for prompt shipment and prices are higher. Considering the season of the year, the demand for Finished Iron and Steel is satisfactory and the mills are crowded with work for the next two or three months. Prices are practically without change.

Muck Bar.—There have been heavy sales of Muck Bar in the past two or three weeks, from 15,000 to 20,000 tons having been sold. The market is firm and we quote standard grades of Muck Bar at \$29.50, f.o.b. maker's mill, Pittsburgh.

Rails.—No large contracts have recently been placed, but several of the leading roads have not yet let their orders for 1902, and will likely do so in a short time. We quote at \$28, at mill, for Standard Sections.

Rods.—We note sales of about 5000 tons of Bessemer Rods, mostly for delivery in first quarter of 1902. We quote Bessemer Rods at \$33, maker's mill, but note that for a large order and desirable specifications this price would be slightly shaded.

Ferromanganese.—We quote Domestic Ferro at \$52.50 to \$53.50 in gross tons, delivered buyer's mill. Foreign Ferro is being offered in this market at lower prices, probably \$50 a ton on large contracts.

Plates.—No additional information has come up in the past week in regard to consolidation of the four Eastern Plate mills, noted in this report last week. It is pretty certain, however, that the deal is an outright purchase of the four concerns by interests very close to the United States Steel Corporation. Demand for Plates is only fair, but will probably be much better before long, as a good deal of business is in sight and will soon be placed. The car builders will be heavy buyers of Plates before long, and some of the shipbuilding concerns will also place large orders soon. In fact, a very material improvement in the Plate situation is expected very early in the year, if not before. Prices are unchanged and we quote: Tank Plate, ¼ inch thick, up to 100 inches in width, 1.60c. at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.80c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, \$1 extra; gauges Nos. 7 and 8, \$3 extra; No. 9, \$5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms, net cash in 30 days.

Spelter.—The market is firm, and we quote best Western grades of Spelter at 4.15c. to 4.20c., Pittsburgh.

Structural Material.—The amount of business being placed in Structural Material for this time of the year is simply unprecedented, and the mills will carry over into 1902 a very large tonnage that ought to have been delivered this year. Most of the tonnage for the Rock Island depot in Chicago, about 10,000 tons, and which was taken by American Bridge Company, will come to Pittsburgh. A large office building to be erected in this city is on the *tapis*, and, if put through, will require fully 10,000 tons. A good many small orders calling from 100 to 300 and 400 tons are being placed, and the Structural mills are filled up with work for the next three or four months. The market is very firm, and there is some talk of an advance in prices, but this may not occur, as several of the leading interests are said to be opposed to putting prices up. Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6

inches, 1.60c.; smaller sizes, 1.55c. to 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.50c., half extras, at mill; Universal and Sheared Plates, 1.60c. All above prices are f.o.b. Pittsburgh.

Sheets.—Heavy contracts for both Black and Galvanized Sheets for delivery next year are being placed, prices to be the same as those in force by the leading Sheet interest at the time deliveries are made on these contracts. Three or four new Sheet mills are just about ready to start, and are soliciting business for next year. Prices in carloads are as follows: Nos. 10, 11 and 12, 2.40c.; Nos. 14 and 15, 2.50c.; Nos. 16 and 17, 2.60c.; Nos. 18 to 21 inclusive, 2.70c.; Nos. 22, 23 and 24, 2.80c.; Nos. 25 and 26, 2.90c.; No. 27, 3c.; No. 28, 3.10c.; No. 29, 3.25c.; No. 30, 3.35c. For small lots of a few bundles of Sheets and for prompt shipment No. 27 brings from 3.15c. to 3.25c., and No. 28, 3.25c. to 3.35c. For large contracts and extended delivery some of the Sheet mills are naming prices about 1-10c. less than the above. For reasonably prompt shipment and small lots, No. 27 Sheets bring from 3.15c. to 3.25c., and No. 28, 3.25c. to 3.35c. We note a heavy demand for Galvanized Sheets, and the market is firm at 70 and 5 off in carloads and 70 off in small lots, maker's mill. For orders of a few bundles, jobbers are able to get as high as 65 off.

Iron and Steel Bars.—A good deal of tonnage in both Iron and Steel Bars has been placed for delivery in first half of next year. However, general demand is not as heavy as some time ago and the mills are catching up to some extent on back orders. The car people have placed some tonnage and will no doubt be very heavy buyers before long for delivery next year. Both Steel and Iron Bars for prompt shipment are scarce and bring from \$1 to \$2 a ton over regular prices. We quote Steel Bars at 1.50c. at mill, half extras, with \$2 a ton advance for open hearth stock and the usual advances for Special Shapes. We quote Iron Bars at 1.55c., Pittsburgh, for Eastern shipment, and 1.50c. for Western shipment.

Merchant Steel.—Some contracts are being placed for delivery in first quarter, and in some cases into summer of next year. The mills are crowded with tonnage and orders for quick shipment are in many cases refused. The market is firm, except on Shafting, and several makers of this are out of the market as sellers until prices improve. We quote: Tire Steel, best quality, 1.70c.; Toe Calk, 1.80c. to 1.85c.; Hammered Lay Steel, 3.50c.; Open Hearth Spring, 2.50c. to 2.75c.; Steel Bars, 1.50c., base, in carloads, and 1.60c. in small lots; ordinary Plow Slabs up to 6 inches wide, 2.25c.; over 6 inches wide, 2.40c. For ordinary orders we quote Cold Rolled and Cold Drawn Shafting at 60 per cent. off in carloads and 55 per cent. off in less than carloads, delivered at all points east of the Mississippi River. We quote Tool Steel at 6c. and upward, depending on quality.

Skelp.—Demand is quiet, there being very little inquiry, except for narrow widths, for which there is some demand. We quote Grooved and Sheared Steel Skelp at 1.70c. to 1.75c., Grooved Iron Skelp, 1.80c., and Sheared, 1.85c., f.o.b. maker's mill, less 2 per cent. off for cash in 30 days from date of shipment. We note a sale of 250 tons of Grooved Iron Skelp at 1.80c., maker's mill.

Merchant Pipe.—There is nothing of special interest to note. The Tube mills have pretty well caught up on back orders and better deliveries of Pipe are being made than for a long time. Several new mills have recently come into the market and, in some cases, are shading established prices to some extent. However, the general tone of the Tube market is firm. Prices to consumers in carloads are as follows:

Merchant Pipe.		
	Per cent. Black.	Per cent. Galvd.
1/2 to 1 1/2 inch and 11 to 12 inch.....	61	48
3/4 to 10 inch.....	68 1/2	56
Casing, Random Lengths.		
2 to 3 inch.....	S. & S. 58	I. J. 53 1/2
3 1/4 to 4 inch.....	63	59
4 1/4 to 12 1/2 inch.....	65	61 1/2
Casing, Out Lengths.		
2 to 3 inch.....	S. & S. 53 1/2	I. J. 59
3 1/4 to 4 inch.....	59	55
4 1/4 to 12 1/2 inch.....	61 1/2	57 1/2

It should be noted that prices to jobbers are 5 to 7 1/2 per cent. lower than the above.

Boiler Tubes.—There never was such a demand for Boiler Tubes as at the present time, and the mills are away behind on contracts. This condition is likely to last for a long time, as heavy orders for Tubes are being placed right along. To consumers prices are as follows:

Boiler Tubes.		Up to 22 feet. Per cent.
Steel.		
1 inch to 1 3/4 inch and 2 3/4 inch to 5 inch, inclusive....		65 1/2
2 inch to 2 1/2 inch, inclusive.....		60
6 inch and larger.....		59
Iron.		
1 inch to 1 1/2 inch and 2 1/2 inch.....		43 1/2
1 3/4 to 2 1/4 inch.....		43
2 1/2 to 13 inch.....		53

Mills name the jobbing trade slightly lower prices than the above.

Coke.—The car situation in the Connellsville region last week was worse than at any time since the car shortage started. One prominent Coke concern have more than 100,000 tons of Coke piled up in their yards awaiting shipment. In fact, at several of the works in the region operations were practically suspended for several days last week, the yards being full of Coke and no room to pile more. The Oliver interest has recently bought about 200 acres of choice Coal lands in the Connellsville region, for which \$1,100 an acre was paid, the highest price ever paid for Coking Coal lands. Output of Coke last week was 236,155 tons, 19,941 ovens being active and 1892 idle, shipments being 10,446 cars. As high as \$2.50 a ton has been offered by furnacemen for Coke for prompt shipment. We quote strictly Connellsville Furnace Coke at \$2 a ton on contracts, and \$2.25 to \$2.50 a ton for prompt shipment. Strictly 72-hour Foundry Coke is \$2.50 a ton, Main Line Furnace Coke, \$1.75 to \$1.85, and Foundry, \$2 to \$2.25, all in net tons at ovens.

Iron and Steel Scrap.—There is a heavy demand for Scrap of all kinds, and the market is firm. Prices on some kinds have advanced from \$1 to \$2 a ton in the past week. Nothing definite has been done in the matter of forming a combination of consumers of Scrap. We quote Piling Scrap at \$18 to \$18.50 gross ton; Heavy Melting Stock, \$18 to \$18.50 gross ton; Old Iron Rails, \$22 to \$23 gross ton; Low Phosphorus Melting Stock, \$19 to \$20 gross ton; No. 1 Railroad Wrought Scrap, \$16 net ton; Cast Scrap, \$12 gross ton; Old Horseshoes, \$11 to \$11.50 gross ton.

The business formerly carried on under the name of the Stanyon-Miller Engineering Company will in the future be conducted under the name of Stanyon Engineering Company, with offices in the Empire Building, Pittsburgh, Pa., as consulting and mechanical engineers for the erection of Steel works, rolling mills, Rod, Wire and Wire Nail mills. They have recently been appointed consulting engineers for the Cramp Steel Company, who are building Bessemer and Open Hearth Steel works at Collingwood, Ontario, Canada. They have a great deal of other work in Canada, and to better facilitate handling it have opened offices in room 402, McKinnon Building, Toronto.

Birmingham.

BIRMINGHAM, ALA., November 25, 1901.

With the advance in Iron, as reported last week, came a slackening up in the demand for it. Whether it was a mere coincidence or whether one was the result of the other is a question whose solution depends upon one's relation to the market. The fact remains that there was some easing off in the demand. But at this season of the year this condition of things is looked for and excites no unfavorable comment. The near approach to Christmas generally brings a quiet market, and after January 15 good buying for spring delivery is inaugurated. The slackening up in the demand was not regretted by the sellers, for there was sufficient to absorb more than they cared to sell. In one instance an order for 3500 tons of Gray Forge for January and February was scaled down to 2000 tons and accepted. In this case, as in some others, the advanced quotations were not rigidly adhered to, as \$10.50 was the value obtained. It

always happens when an advance occurs that a contingent of belated buyers appear as applicants for Iron at previous prices, and with explanations of such a specious nature that success must and does follow in particular cases. So when concessions are mentioned here there should be added "in particular cases." The aggregate sales for the week were greater than the output and covered all the months of the first half of 1902. The bulk of the sales were at the advance established last week. The stocks, it is anticipated, will show a large decrease for November, and this showing, it is confidently expected, will have a favorable influence in the maintenance of prices and in the stability of the market. The scarcity of cars at disposition of shippers continues, and though "any old thing" in the way of a car that can be used is impressed into service, there seems to be no easing up as yet in the situation. The demands of shippers for cars are registered "for reference." All the roads centering here are "in it." None are exempt. As to production, it is a question if any increase can occur in the near future. We have had so far fine, open weather. For mining Iron and Coal it could not have been more favorable. Yet we have here the same complaints that prevail in other districts concerning the difficulty of assembling of material in prompt time and in quantity sufficient to make the furnace stock "in easy circumstances." Some of our furnaces have, of late, escaped the inconvenience and loss attendant upon banking, literally, by the "skin of their teeth." If this occurs when weather conditions are most favorable, it is only prudent to calculate that when the bad weather ahead of us makes its advent conditions will not improve. On the contrary they will be aggravated. It looks as if the furnaces out of blast will be slow about going into commission again. Quotations on the basis of \$11.50 for No. 2 Foundry about fairly represent the market.

The Coal interests are yet in a bad way as to cars. The mine of the Republic Company, at Warner, with the largest output from a single slope in the State, approximating 2000 tons, was closed three days last week on account of inability to obtain cars. Another instance of the shortage in cars is given in the assertion of another large interest that they could and would have shipped 50,000 tons more than they have shipped since October 1 if they could have obtained the cars for which application was made. The same complaints come from other sources. In fact they are universal, and the loss to parties interested is serious.

The Coosa Valley Iron & Mining Company, controlled now by New York and Gadsden parties, have been incorporated. They have the usual liberal charter and are capitalized at \$100,000. Though the gleaners are many the field is not yet occupied.

The German Iron Market.

ESSEN, November 10, 1901.

The unfavorable condition of the Iron market as reported last month has not improved in the least. From everywhere we learn of the want of employment, which condition, it seems, cannot be relieved in spite of the expected orders from the State for railroad material, because the general trade holds back orders for want of confidence. The result is retrenchment in the mills and the discharge of help, and in some works suspension of work during four days in a week. In consequence thereof we turn our attention more than ever to countries abroad in order to keep up the market by filling orders for exports, even if they have to be taken at unremunerative prices. During the last few days, however, a sudden stoppage of export orders has taken place; it remains to be seen whether this is only temporary or whether the wants of foreign countries have suddenly ceased altogether.

According to official statistics 329,765 tons of Iron and Hardware (exclusive of machinery) were imported during the first nine months of 1901, against 775,807 tons during the same time last year, showing a decrease of 58 per cent. in importation. At the same time exportation has increased nearly 500,000 tons, having been 1,599,477 tons, against 1,124,416 tons in 1900. In ma-

chinery and parts of machinery 58,245 tons were imported during the first three-quarters, against 79,965 tons in 1900, and 162,338 tons were exported, against 178,421 tons in 1900. Consequently imports have decreased 27 per cent. and exports 10 per cent. A considerable improvement in the exportation of locomotives and automobiles is to be reported, the movement having been 14,350 tons, against 9665 tons in 1900, the increase being about 48 per cent.

As regards the several branches of the Iron trade, it may be stated that the Iron Ore market is practically at a standstill; contracts are still running into next year, and new prices will be made later and will certainly be materially modified. In Minette Ores some business at reduced prices has transpired; Swedish and Spanish Ores are offered at considerably lower figures. The market for Pig Iron is firmer, owing to increased export orders, and large lots of high grade Spiegeleisen have been contracted for America, although at low prices; for Great Britain also several contracts for Foundry Pig and Bessemer Pig have been closed. The new wants for home use continue to be very deficient.

Spiegeleisen is quoted at 78 marks; White Mill Iron, 60 marks; Mill Iron, 62 marks, all per ton, f.o.b. Siegen; Foundry Pig No. 1 and Bessemer Pig cost 65 marks; No. 3, 61 marks, per ton, at mills, while English Foundry Pig is held at 63 marks, f.o.b. Ruhrort. Imports into Germany of foreign Pig Iron during the first nine months of 1901 have fallen to 223,350 tons, against 562,998 tons during the same period of last year.

In Scrap Iron the orders far exceed the demands and prices are naturally going down. Large quantities of Scrap Iron have been bought for export to Canada.

In Crude Steel the old contracts are gradually running out and larger lots are coming into the market. The demand is only for quantities for immediate delivery, as Steel consumers are only buying from hand to mouth. Prices rule as follows: Ingots, 75 marks; Blooms, 80 marks; Billets, 90 marks, per ton, at Dortmund, Ruhrort, Rothe Erde or Diedenhofen. Shipments of Crude Steel are of late considerably influenced by the export movement, which has never been as high as at present, the exports of intermediate products for the first quarter of 1901 having been 91,771 tons, against 20,068 the year before. Work in the rolling mills is very irregular. In Iron Bars and Bands business is insignificant at ruinously low prices; the market for Skelp has improved, on account of increased demand from the Tube works. The business in Beams is quiet, owing to the advanced season of the year. For construction material the market is better, as work seems more plentiful. Prices are as follows: Iron Bars of Thomas and Siemens-Martin material, 100 to 105 marks; of Hard Steel, 110 to 115 marks; best brands, 135 marks; Bands quoted as high as 115 marks; Skelp for Boiler Tubes, Soft Steel, 120 to 125 marks; Skelp for Gas Tubes of Hard Steel, 122.50 to 127.50 marks; Skelp for Boiler Tubes of Hard Steel, 140 to 145 marks, all per ton, at mill. Beams cost 107.50 to 112.50 marks, at mill, but orders for export have been closed at 90 marks per ton, f.o.b. port of shipment. Building Iron, usual dimensions, fetches from 105 to 110 marks per ton, at mill. There is a brisk business doing in Gas Tubes, while the Boiler Tube works are complaining of new orders coming in but sparingly.

In ordinary Plates and Ship Plates business is active, while Boiler Plates are dull. Selling prices as fixed by the trust are for ordinary Plates of Soft Steel 140 marks, and for Siemens-Martin Plates of Soft Steel, Boiler Plates and Locomotive Plates at 180 marks per ton, f.o.b. Essen, Siegen, Dillingen and Königshuette; smaller contracts up to 5 tons at 5 marks more per ton.

For Sheets there is a good demand, especially for export, but the works are underbidding one another. The nominal price is 130 marks, but sales have been made at much lower figures.

In Wire Rods the market is quite active. Ordinary Soft Steel Wire Rods are quoted inland at 135 to 140 marks; Hard Steel Wire Rods are sold at the unremunerative price of 125 marks.

Wire Nails cost 145 to 150 marks and business has been very active, since America has ceased to compete as much as it did formerly.

New York.

NEW YORK, November 27, 1901.

Pig Iron.—Consumers are not only covering their requirements pretty generally for the opening months of the coming year, but some of the most important Eastern foundrymen are seriously considering the question now of making contracts to cover their entire necessities for 1902. The disappearance of stocks at the furnaces and the maintenance of an excellent condition of general business are causing them to feel somewhat apprehensive about the course of prices, and they feel that it will be wise to protect themselves. Northern Irons have been marked up to some extent and our quotations are revised accordingly. We quote: No. 1, \$16.35 to \$17.50; No. 2 X, \$15.65 to \$16; No. 2 Plain, \$15.15 to \$16; Gray Forge, \$14.65; Tennessee and Alabama brands, No. 1 Foundry, \$16; No. 2 Foundry, \$15.25; No. 1 Soft, \$16; No. 2 Soft, \$15.25; No. 3 Foundry, \$14.75; No. 4 Foundry, \$14.25; Gray Forge, \$14.25.

Cast Iron Pipe.—While immediate business is light, owing to the advent of cold weather, manufacturers of Pipe are busy answering inquiries for next year's delivery. Such inquiries are much heavier than usual and indicate another period of great activity. Prices are stronger in sympathy with the higher rates now being named for Pig Iron, but quotations have not been changed from \$26 to \$27, gross ton, tidewater.

Steel Rails.—The Eastern mills are booking numerous orders, a considerable percentage of them coming from electric lines which will either be constructed or extended next year. The improvement in the business coming from this direction is shown by the greatly increased orders which have come from individual buyers. Some of these buyers have enlarged their purchases ten times as compared with the quantities they ordered the past year. Standard Sections are still quoted at \$28, Eastern mill.

Finished Iron and Steel.—All branches report a continuation of excellent business. No large contracts have recently transpired, but the volume of business, particularly in Structural Material, is extraordinarily good. Angles continue scarce and in strong demand, and it is stated that some foreign Angles have been ordered for importation. Prices are quoted as follows at tidewater: Beams, Channels and Zees, 1.75c. to 1.80c.; Angles, 1.75c. to 1.80c.; Tees, 1.80c. to 1.85c.; Bulb Angles and Deck Beams, 2c.; Sheared Steel Plates are 1.80c. to 1.85c. for Tank, 1.90c. to 1.95c. for Flange, 2c. to 2.05c. for Fire Box. Charcoal Iron Plates are held at 2.40c. for C. H. No. 1, 2.90c. for Flange, and 3.40c. for Fire Box. Refined Bars are 1.65c.; Soft Steel Bars, 1.70c.

Metal Market.

NEW YORK, November 27, 1901.

Pig Tin.—Although the shortage of spot Tin is near an end the corner which was effected almost two weeks ago is more keenly felt at this time than ever. The spot market has been bid up to 33c. The first direct steamer came in on the 23d inst. with 125 tons. Since then another steamer arrived with 325 tons, bringing the total arrivals for this month at this hour to 1100 tons. Under ordinary conditions direct steamers unload very slowly after their arrival. Owing to the present state of affairs, however, the importers will exert every effort to have the steamers unloaded as quickly as possible. There is still another steamer, however, that is momentarily expected. It is more than a week overdue. Nothing has been heard of it as yet. At the close to-day spot Tin was quoted on "Change 33c. bid and 34½c. asked. December sold at 25¼c. and January 25c. The London market has advanced sharply, in sympathy with this market, on spot. The discount on futures has been increased to £8½. Closing London prices to-day were £116 15s. for spot and £109 7s. 6d. for futures. As can be imagined under existing circumstances, business during the week was slow. Purchases for consumption were only of retail proportions. The Banca sale will be held at Amsterdam to-morrow and about 2500 tons are to be disposed of.

Copper.—Rumors were rife again regarding a prospective cut in prices. The reports came from the Wall street section, however, and have thus far proved to be unfounded. Owing to the depression of the principal Copper stock, interest in the Copper situation has become more acute. As to active trade conditions, however, the situation is unchanged. Prices are unchanged, but for the statements that Lake can be had at 16¼c. The principal Lake producing interests are said to be selling December Copper at this figure, and are said to have a quantity of it for sale at this price. Electrolytic is unchanged at 16.30c. to 16½c., and Casting Stock is quoted 15½c. to 16½c. The London market declined from day to day and cabled a discount of £2 10s. on futures this morning. This is accepted as showing the lack of faith in the future of the article abroad. At the close to-day spot was quoted £65 and futures £62 10s. The market was said to be very weak. Best Selected was quoted at £72, showing a decline of £1 5s.

Pig Lead.—Is entirely unchanged. The American Smelting & Refining Company still quote 4.37½c. for Desilverized, f.o.b. New York, and 4.32½c., St. Louis. London quoted £11 3s. 9d.

Spelter.—Business is quiet at 4.30c. here and 4.10c. to 4.15c., St. Louis. London is unchanged at £16 12s. 6d.

Antimony.—Is unchanged. Hallett's is quoted 8½c. Cookson's is unchanged, being held nominally at 10¼c. Outside brands declined to 8c. to 8¼c.

Nickel.—Is unchanged, prices continuing on a basis of 60c. for lots not covered by yearly contracts.

Quicksilver.—There is no change here. The price is \$51 per flask of 76½ lbs., in lots of 50 flasks and more. London has declined 2 shillings 6 pence, to £8 17s. 6d.

Tin Plates.—The situation is unchanged. The American Tin Plate Company are selling only for the first quarter of next year on a basis of \$4.19 per box of standard 100-lb. Cokes, f.o.b. New York, and \$4, f.o.b. mills. There was a decline of 3 shillings in London, the price falling to 13 shillings 3 pence.

New Publication.

COMPRESSED AIR; ITS PRODUCTION, USES AND APPLICATIONS. by Gardner D. Hiscox, M.E. Norman W. Heuley & Co., publishers, New York, 1901. Price, \$5.

This comprehensive work is a large octavo volume of 820 pages. It contains 40 air tables, and has 545 illustrations. The subject is elucidated in 35 chapters, beginning with an historical retrospect of the progress of air work, and ending with a list of patents, from 1875 to July, 1901. It also contains an index for reference. In dealing with the physical properties of air we are told that "The height of the atmosphere appears to have no determinate limit, but it gradually fades away in density and pressure to its confines with interplanetary space. At about 40 miles the refractive effect of twilight ceases; above that elevation the air is either too rare or too pure from foreign particles to send us any perceptible reflection or illumination. There is abundant evidence, however, from the phenomena of meteors that the atmosphere extends to a height of 100 miles at least, and it cannot be asserted positively that it has any well defined upper limit."

The chapter on air pressures below atmospheric pressures gives us examples of the commercial utility of a vacuum, with machines and methods for drying various substances in vacuo, and the vacuum in salt making. The power of the wind is exemplified by reference to scientific kite flying, as practiced at the present time, the box kite and the form known as the Hargrave kite are explained, and also the wind mill and its work. Air compression under low pressure is referred to, the Root positive blast blower being taken as an example. Gasoline torches and the gasoline soldering copper are illustrated and explained, with some observations on compressed air for glass blowing.

Chapters VII to X deal with a very important and interesting department of the subject, though they may be said to relate to theory. Theory, however, underlying the practical development of the work of air compression and expansion is most necessary to comprehend. Isothermal compression and expansion of air, thermodynamics, the latter including articles on the specific heat of air, the mechanical equivalent of heat

and the absolute zero of temperatures. Adiabatic compression and expansion leads up to the compressed air indicator card.

The next four chapters conduct the reader through a discussion of the actual work of the compressor, multistage air compression (with the related subject of inter coolers and after coolers), the expansion of compressed air and the work of the motor and the transmission of power by compressed air.

The subject of compressed air reheating and its work discloses one of the most important economies practised in the use of air. Various forms of reheaters are shown and the theory upon which they operate is fully set forth, and the hot air engine with closed cycle card from a Rider hot air engine is given. The next chapter is devoted to the compressed air motor. The efficiency of air compressors at high altitudes comprises a survey of the use of compressed air with motors, and gives numerous tables for the use of compressed air for all purposes, the capacity of compressors and the measurement of air by meter.

The next four chapters, XVIII to XXI, deal with various types and makes of air compressors. One of the earliest forms, the tromp or hydraulic, was used as the principal means for furnishing a steady blast for the Catalan forges of the early years of the iron age. The tromp device, though somewhat primitive, was the lineal ancestor of the Taylor hydraulic air compressor. A detailed description with illustrations of this ingenious and economical method of using falling water to do the work of air compression, as installed at Magog, in the Province of Quebec, Canada, is given, and also the hydraulic compressor used at Ainsworth, in British Columbia. Speaking of the Taylor compressor in Quebec we are told that, "In tests of efficiency it has been found that the gross power of the water passing through the compressor due to its natural fall was 158 horse-power, of which 111 horse-power was utilized in the work of air compression, giving an efficiency of 70 per cent. of the gross power used." Later experiments, with modification of the air inlet pipes and water head, gave an efficiency of 75 per cent. A small form of hydraulic compressor made by the L. E. Rhodes Company of Hartford, Conn., is shown. It consists of two displacement cylinders with alternating water valves to control its operation. A direct acting hydraulic air compressor was used in driving the famous Mont Cenis tunnel, the power for it was derived from a mountain stream, which gave a head of 85 feet. This idea has been since embodied in many patents. Following on in the discussion of direct compression machines the author remarks, "It is evident that an air compressor which has the steam cylinder and the air cylinder on a single straight rod will apply the power in the most direct manner. . . . It is evident, however, that this straight line or direct construction results in an engine which has the greatest power at a time when there is no work to perform." Many efforts have been made to correct this defect by the construction of machines on the crank angle principle. In speaking of the Westinghouse air pump, as used on locomotives, he says: "The early direct acting compressor used steam at full pressure throughout the stroke. The Westinghouse pump is built on this principle. . . . Such construction is admitted to be wasteful, but in some cases, notably that of the Westinghouse pump, economy in steam consumption is sacrificed to lightness and economy of space."

Upward of 70 air compressors of various types, sizes and makes are mentioned, either steam actuated, belt driven, electrically operated or with hand power. These chapters unfold a marvelous wealth of inventive and creative power, as well as much resourceful and adaptive ability, displayed in working out the problems which must always confront the designer and builder of such machines.

Under the head of compressed air in mining and quarrying, the many forms of rock drills and coal cutters are shown and described. The chapter concludes with some observations on impact, or the force of percussion in hammers and percussion drills. In these devices "The effect of cushioning of the piston is a beautiful illustration of the control that can be made over an intense mechanical force, that by the mere movement

of a hand may have its power varied from zero to a percussion pressure of over 1300 tons."

A wide field is opened up with the subject of pneumatic tools. First comes the hammer and its work. The various kinds in use are illustrated in section and their wonderfully rapid reciprocating action is explained. Riveters, drills, holding-on tools, rammers, sand sifters, casting cleaners, flue welders, drift bolt drivers, air hoists, cranes, punches and stay bolt biters, all come in for explanatory mention.

Chapter XXV deals with air as applied to pyrometry. Cuts of the different kinds made, with appropriate comment, explains the principle and action of each. Compressed air in railway service follows, which deals with street railway cars operated by air, and cars and locomotives for service in mines. The use of air in railway signalling and for dumping cars is touched on, and the details of the Westinghouse air brake are taken up broadly.

Principal among the uses to which air is applied, grouped as "Pneumatic Work," in this book, may be mentioned compressed air for raising sunken vessels. Casks, tanks or air bags, filled with water, are submerged and fastened to a wreck, after which they are gradually emptied of water and filled with air until their combined buoyant effort is sufficient to raise the vessel to the surface again. The uses of air for the purposes of submarine exploration are familiar to all, the diver is dependent upon a continuous quantity of air, which is usually supplied by a double acting air pump operated by hand power, a cut of which is given. In this connection, though not mentioned in the work we are considering, the writer remembers to have recently read of a diver who was supplied with air from a Westinghouse locomotive air pump while carrying on his work under water. The sand blast for sharpening files, compressed air for cleaning castings and for painting are now familiar operations fully described here. Compressed air for blasting coal and sinking caissons are other operations explained by Mr. Hiscox, which are perhaps less familiar to the public.

In the pneumatic system of tube transmission a description of the system used by the Post Office authorities in Philadelphia and New York is given. One of the most interesting and ingenious methods of surmounting a difficulty encountered in operation, it may be worth while to mention. Our author says, "Considerable apprehension arose from the accidental lodgment of a carrier in the Philadelphia tube and also later in the New York and Brooklyn Post Office line. The plan was to disconnect the terminal apparatus at one of the stations, fire a pistol into the tube and note the time that elapsed between the discharge of the pistol and the return of the sound, as an echo reflected back from the obstructing carrier; then, knowing the velocity of sound, a simple calculation would give the distance from the station to the carrier." This was done and subsequently the pipe was uncovered at the point which this experiment indicated and the carrier which had "balked" was found stuck fast at the exact point where calculation had located it. This remarkable incident proves that Uncle Sam himself not only shows his wisdom in the use of the latest air appliances, but what is much more to the point, as any practical man could tell him, he knows how to quickly remedy the occasional failures which are sure to follow upon the use of delicate and high grade mechanical devices.

The concluding chapters deal with compressed air in warfare, which is an explanation of the pneumatic dynamite gun; and compressed air for raising water, purifying and aerating it, refrigeration and cold storage, the hygiene of compressed air, in which the physical effects of compressed air on workers confined in it are detailed. Liquid air, its properties and uses, closes the book.

The whole subject of compressed air in its various and complicated uses in the arts is treated with minuteness, and the ground is fully covered in this work. As a complete treatise on the subject Mr. Hiscox's work is certainly entitled to a high place in the literature of practical mechanical work, and is a valuable book for the library and is useful to the student and the practical man who uses compressed air in any form.

Iron and Industrial Stocks.

By far the most interesting development of the week was the heavy decline in Amalgamated. The transactions were extremely large, and it was generally accepted that the heavy holders were unloading in large quantities. The downward movement commenced on Saturday, when the stock dropped three points, to 83½. On Monday there was a further drop to 80, and Tuesday added to the decline by two points, the market closing at 78. Wednesday morning brought a recovery, and by noon the quotation was 80¾.

As to the general situation, the market made a steady showing with a strengthening tendency. On Wednesday the market was especially strong, General Electric being the notable feature. It advanced seven points. United States steel was favorably affected by the announcement on Wednesday morning from J. P. Morgan & Co. that the underwriting syndicate has completed its work and that the plan was very successful. By noon United States Steel, common, had advanced 1¼ points on the strength of this announcement.

The Sharon Coke Company, who are an identified interest of the Sharon Steel Company, will issue \$1,250,000 5 per cent. bonds, dated December 1, 1901, and redeemable at par after five years.

It is officially stated that every share of common and preferred stock of the National Tube Company is now owned by the United States Steel Corporation. In the future no dividends will be given out by the National Tube Company for publication, as the United States Steel Corporation are the only stockholders interested. It is understood, however, that the dividend rates will be 7 per cent. on the preferred and 6 per cent. on the common per annum. All the works of the National Tube Company, with one or two exceptions, are in full operation and have plenty of tonnage to keep them running for some months to come.

Dividends.—The National Lead Company have declared their fortieth quarterly dividend of 1¼ per cent. on their preferred stock, payable December 16. Books close November 26 and reopen December 17.

The directors of the Osceola Consolidated Mining Company have declared a dividend of \$3 a share, payable December 23 to stock of record November 27. Books will be closed at 3 p.m. November 27 and reopen at 9 a.m. December 11.

Cincinnati Machinery Market.

CINCINNATI, OHIO, November 23, 1901.

The most important event in machinery circles in this city within the past month has been the destruction by fire of the fully equipped plant of the American Laundry Machinery Company on West Pearl street. About \$25,000 to \$30,000 worth of machine tools were either totally destroyed or badly damaged by the fire. A portion of this were the wood working tools in the pattern making and the department devoted to the wooden portions of the machines. This, however, was a very minor part of the business, giving employment to only about 15 or 20 hands. The main loss was in the iron working department. The company were doing a large and profitable business, and in order to preserve their trade without interruption they have leased for an indefinite period the equipped shops belonging to the Barker & Chard Machine Tool Company on Culvert street. The company have not as yet fully determined on their line of action in the future. The buildings which they have recently occupied are a total wreck and they will hardly be rebuilt for their occupancy. The chances are strongly in favor of them going out on one of the lines of railroad in the suburbs of this city and erecting a modern arranged plant. In any event they will be obliged to act quickly, and the probability is that they will be in the market for a large machine tool and general shop equipment at an early day. The company had a value in stock and machinery drawings and office equipment amounting to somewhere near \$100,000, on which they had \$60,000 insurance.

Among the unusually large machines which the Cin-

cinnati Punch & Shear Company have built recently is an E punch to go to a frog and switch works, Hamilton, Ohio. This machine is just now being shipped from the shop and weighs complete 46,000 pounds. The frame, cast in one piece, weighs 19,500 pounds. They are also on the point of shipping a multiple punch 10 feet wide, to punch 30 holes, for jail work, the second of its class which they have built this year, one of which was shipped to St. Paul and the last one for a company in this city.

The Cincinnati Shaper Company have made a big hit with the traverse head double and single shapers which they have brought out during the present year. The largest machine tool of this character which they ever built, and which is probably about as large as was ever built in this section of the country, is now ready for shipment to a point in Connecticut. It is a 30-inch stroke double header, each head to be operated by an attached 5 horse-power motor. The bed is 16 feet long and 14 feet high, and it cuts ¾ x ¼. Altogether it is a magnificent and formidable looking tool, and will undoubtedly make its mark and materially aid in sustaining the reputation of the company.

The Bickford Drill Company have started 36 of their new type No. 1 drills, the entire lot to be ready for shipment some time in December. It is a matter of congratulation that of this number the company have already contracted for 32. Owing to the increase in business, they have been considerably hampered lately for lack of sufficient shop room, and in order to give them the space they desire so greatly they have taken a building across the street, remodeled it and equipped it for office, drafting room and pattern shop, and it is the intention to move into it at an early date.

The Belmer-Eames Machine Company are congratulating themselves on a very successful year just closing. They report a good fall for the largest sized planers which they manufacture, and regard the outlook as sufficiently bright to justify them in increasing facilities and adding to their force. Just ready for shipment in their shop is one of their new pattern 6 feet by 56 inches four-headed planer, with 18-foot table, the net weight of which, when ready for shipment, is about 38,000 pounds. They have recently added a new automatic gear cutter and a 24-inch lathe to their equipment of tools.

Smith & Mills, makers of 12 to 32 inch stroke shapers, report the fall trade as excellent. They say that the period of inactivity during the strike last summer is largely responsible for the stress of business now placed upon them. All of the surplus stock which had been accumulating for months was cleaned up during the strike, and the firm now find themselves closely pushed to keep within sight of their customers.

The American Tool Works Company report that the new radial drills which they got out last spring are the best sellers in the shops, the call for them being out of proportion to the other shop products. Fall trade they report as specially active in domestic circles, and the outlook as good as they could reasonably ask. They are now designing and taking the preparatory steps toward getting out a complete line of new shapers which they confidently expect will make a record in machine circles.

The J. M. Robinson Mfg. Company might be a new concern as far as the title goes, but in reality it is only an old friend with a new face. The business which has for so many years been run under the name of J. M. Robinson & Co. was capitalized very recently and incorporated under the laws of Ohio, with a capital stock fully paid in of \$50,000. They have moved their office into the second story of the building, and otherwise rearranged their plant.

The I. & E. Greenwald Company are now estimating on a very large quantity of heavy new work; one of the last contracts which they have taken is for a powerful coal dredger for the Cincinnati Gas & Electric Company. Their gear trade, which they regard as a test of the activity in manufacturing circles, is more active at present than it has been for a long time, and they estimate the prospects as very flattering.

The Philadelphia Machinery Market.

PHILADELPHIA, Pa., November 25, 1901.

The market continues favorable in almost every branch of the trade, the condition and tone being if anything better than during last month. There has been no falling off in demand in any particular line and some manufacturers have had much more business offered than they could take on. In these lines manufacturers have reached a point when orders can only be accepted for deferred deliveries—the more distant the better suited is the manufacturer. A large number of the shops have their order books so well filled that continuous active work is assured for six, eight and ten months, and in some cases even a year hence. These conditions exist notably among the manufacturers of electric cranes and heavy machine tools. Some shops are now working overtime and others are considering the advisability of doing so. The depletion of stocks on the floors of ware-rooms is not as noticeable as it was a month ago, stocks of standard small and medium sized tools being apparent. This, however, is not unusual at this time of the year and causes no anxiety, as buyers whenever possible defer the purchase of new tools until after the first of the new year. Inquiries have been numerous and the tone is considered to be very favorable. A number of good contracts are said to be in the market from buyers, who usually close a deal soon after the inquiry. The various railroad companies looking forward to making their shop equipment more complete have sent out a number of inquiries and some orders have been taken and branches of the trade are feeling the effect of both the inquiries and orders. Foreign demand shows no activity, and it is reasonably sure that nothing will develop in that field under the present existing conditions. Some manufacturers continue to transact the usual amount of foreign business, but this is only in special lines.

Deliveries cannot be said to be very good and with the continued activity are becoming more difficult every day. The delay in getting material is felt in many lines, and no immediate relief is looked for, although it is hoped that by the first of the year an easier condition will prevail.

The various local foundries, both iron and steel, still continue filled up with work, and deliveries from these sources are not improving over those of last month. Foundries in the immediate vicinity of this city have taken on a large amount of work and are nearly as far behind in deliveries as the local plants.

The demand for power transmission machinery, cranes, and heavy machine tools continues the largest, special tools and those of the heaviest types are taking up considerable space, not only on manufacturers' order books, but on their floors. This portion of the machinery trade is very firm and most manufacturers are accepting orders only for delivery well toward the middle of next year. Among the manufacturers of the smaller machine tools, engines and boilers, continued activity is reported, with a very satisfactory outlook both as to inquiries and orders. Dealers in these lines report a slight falling off, but as we said before, this causes no uneasiness, and is rather expected at this time of the year. Inquiries which will probably culminate in orders early in 1902 are abundant, and the trade looks forward to considerable business with the opening of the new year.

Prices in all lines are being maintained with firmness, no tendency toward lower figures is noticeable, while talk of advances in some lines has been heard, but no action in that direction has been taken.

W. E. Shipley, builder of metal working machinery, has had an active month. Inquiries are maintained in good volume and promise some very satisfactory business in the near future. A large Cincinnati lathe has been delivered to the Pencoyd Works of the American Bridge Company, and the Baldwin Locomotive Works have been furnished with a Cincinnati shaper.

The Keystone Machine Tool Works have shipped one of their new electrically driven pipe expanding and flanging machines to the New York Ship Building Company, Camden, N. J. These people report a good volume

of business on hand, with indications for future trade favorable.

I. H. Johnson, Jr., & Co. report trade with them in a most satisfactory condition. Inquiries are in good volume, and the prospective business is very favorable. A number of orders have been booked and all departments of the works are running on full time. Recent deliveries of lathes include one 66-inch by 29 feet for New Jersey delivery, and one 58-inch by 20 feet for local parties. Numerous shipments of smaller lathes have also been made.

The Philadelphia Machine Tool Company are running all departments of their plant on full time and the volume of inquiries and orders is very satisfactory. Among recent deliveries may be mentioned two Standard Philadelphia testing machines, 50,000 pounds capacity each, for Pittsburgh and for Chicago delivery. Three presses have also been shipped to Chicago, Ill., and several special rolls for sharpening shear blades have been delivered to Wilmington, Del., parties. A Leggæ file grinding machine has been shipped for Fitchburg, Mass., delivery, and several more are in course of construction.

The Royersford Foundry & Machine Company, Royersford, Pa., advise us that they are extremely busy on orders for punch and shearing machinery, having recently shipped two single shears to the Westmoreland Steel & Mfg. Company, Huff, Pa.; one No. 2 combined machine to the Shaw Electric Crane Company, Muskegon, Mich., and one to C. C. Lineau, Newark, N. J. One No. 1 combined machine was also shipped to the W. C. Koller Carriage Company, Glen Rock, Pa., and a No. 2 machine to the S. M. York Machinery Company, Cleveland, Ohio. A number of machines are also in course of erection, two of which are for the Prentiss Tool & Supply Company, New York, one of which is for export. All departments of their machine shop and foundry are being operated to the fullest extent with the full complement of men, and conditions generally are regarded as being very favorable.

The Philadelphia Roll & Machine Company are operating both foundry and machine shops to their full capacity. Hydraulic machinery consisting of intensifiers and accumulators are being made for Chas. T. Schoen; a number of roll lathes for the Lake Superior Power Company, Sault Ste. Marie, Ont., and fire proofing apparatus for the United States Fire Proof Wood Company, Philadelphia, Pa., are also in course of manufacture. The roll trade continues quite active, rolls having been recently shipped to a number of the large steel companies.

The Franklin Machine Works, Incorporated, report inquiries numerous with orders of a very satisfactory nature. They are running full in all departments of the works. Among recent shipments may be mentioned a large tool room boxing machine for Western delivery, which resulted in a duplicate order from the same parties. Several cold saw cutting off machines have also been shipped for local delivery, and two slab milling machines have been shipped to New Jersey parties.

At the Crane department of the Niles-Bement-Pond Company general activity is to be noted. Orders are numerous with a large amount of business in sight, and the present bookings are sufficient to keep the plant in continuous full operation for many months to come. Among recent orders may be mentioned 14 electric traveling cranes for the various plants of the American Locomotive Company, which vary from 10 to 14 tons capacity. Two cranes on this order have already been shipped to the Brooks Works. Twelve cranes have been shipped to various parties and are now being erected, one of which is a 20-ton crane with a 5-ton auxiliary hoist for the United States Cast Iron Pipe Company; another 10-ton 60-foot span crane has been shipped to the Pennsylvania Steel Company, Steelton, Pa., and a duplicate for the same parties is building. Two cranes, 20-ton capacity, 50-foot span, have been shipped to the Quincy Engine Works, Quincy, Ill., and two 25-ton cranes with 5-ton auxiliary hoist, have been delivered to the Dodge Mfg. Company, Mishawaka, Ind.

The Energy Elevator Company are busy meeting the demand for their general line of elevators. Inquiries

and orders have been satisfactory; among those booked may be mentioned a large carriage lift for the United States Government, through New York parties; and a worm gear freight lift for Riverside, N. J., delivery. Elevators have been recently completed for the Godshall Mfg. Company, and for a number of local parties.

Alfred Box & Co., manufacturers of electric cranes, hoists, &c., are very busy, particularly in the crane department. Inquiries are numerous and some large orders have recently been booked. Recent deliveries of cranes include two 25-ton electric traveling cranes for the National Transit Company, Oil City, Pa.; one 25-ton 98-foot span 3-motor electric crane has also been delivered to the New York Edison Company, New York, for the Waterside Station; one 5-ton portable electric hoist jib crane for the Gould Mfg. Company, Seneca Falls, N. Y.; two 5-ton 3-motor electric traveling cranes for the General Electric Company, Lynn, Mass.; one 50-ton hand power traveling crane has also been shipped to the Batavia, Ill., power station of the Aurora, Chicago & Wheaton Railway Company. Four electric traveling cranes are under construction for export to Japan, and a number of smaller electric and hand power cranes are also being built for various parties.

All departments of the Eynon-Evans Mfg. Company are actively engaged. The pattern shop is working on a large amount of work for the Wm. Cramp & Sons Ship & Engine Building Company and a number of other concerns. The foundry has among other work on hand a number of castings in special acid resisting bronze for chemical and mine work, while the machine shop is busy on steam jet blowers for gas producers and on special work for the New York Ship Building Company. Among recent shipments of blowers may be mentioned deliveries to the Tennessee Coal & Iron Company, Ensley, Ala.; Diamond State Steel Company, Wilmington, Del.; National Tube Works, McKeesport, Pa., and the Burden Iron Works, Troy, N. Y.

Plans are being prepared for an addition to the foundry of Meerbeck & Schneider, Frankford, Phila. A one-story foundry, 75 x 300 feet, specially designed for heavy casting work, is to be erected. Traveling cranes of 25 and 50 tons capacity are to be installed, also sand blast machinery and automatic chippers. Special arrangements for charging cupolas are to be considered and new engines and boilers will be installed.

The Midvale Steel Works are busy in all departments. The various improvements to their plant (previously reported in these columns) are being rapidly pushed forward. Some of the new buildings are under roof, while others are not quite as near completion.

The Southwark Foundry & Machine Company are exceedingly busy. Inquiries and orders are quite numerous, and a satisfactory condition of trade prevails. All departments of the plant are running full time and numerous shipments are being made to various parties.

The Logan Mfg. Company, Phoenixville, Pa., advise us that they are busy on a large amount of general machinery castings, for which class of work they have particularly fitted their plant. Among work on hand they mention general castings for the Baldwin Locomotive Works and steam and air cylinders for the Southwark Foundry & Machine Works, Philadelphia, Pa.

The J. W. Paxson Company, foundry supplies, find trade very brisk, and particularly in molding sand. The demand for the equipment of foundries and supplies is large; among recent orders may be mentioned several for the Paxson-Warren sand blast apparatus, one being for the American Sanitary Company, Elizabeth, N. J.; and another for the Uniform Steel Company, Newark, N. J. A 54½-inch Paxson-Colliau cupola is to be installed for the Delaware Foundry Company, Burlington, N. J.; a 63-inch cupola will be furnished the David & King Supply Company, Charlotte, N. C., and the Harrison Safety Boiler Company, Philadelphia, Pa., have placed an order with them for one of the same size. An order has also been received from R. Blickenderfer, Lancaster, Pa., for a 54½-inch Paxson-Colliau cupola and a Paxson-Green pressure blower.

Activity continues unabated at the plant of the Baldwin Locomotive Works, and all departments are being

operated to their best capacity. This year's production of locomotives will, if the expectations of the company are realized, reach a total of 1550 engines, over 1200 having been built during the first nine months of the year. The new cylinder finishing shop is about completed and awaits its equipment of machinery, which has been delayed in delivery. Recent orders received by the Baldwin Company include four engines for the Coahuila & Pacific Railroad, two for the Detroit & Mackinac Railroad, one for the Shreveport & Red River Valley Railroad, ten for the Cincinnati, New Orleans & Texas Pacific Railroad, two for the Lexington & Eastern and 120 for the Atchison & Topeka & Santa Fé Railroad. Deliveries are being made with the usual regularity to the Pennsylvania Railroad, Nashville, Chattanooga & St. Louis, Atchison, Topeka & Santa Fé, Southern Railway and the Southern Pacific Railroad. Two locomotives have also been delivered to the Tehuantepec Railway, Mexico.

Jenkins & Lingle, engineers, founders and machinists, Bellefonte, Pa., advise us that the demand for their line of power hammers has been very active, and among orders now on their books mention: Three 100-pound hammers for the Draper Company, Hopedale, Mass.; two 200-pound hammers for the Pennsylvania Railroad Company, one 100-pound hammer for Sanford & Brooks, Baltimore, Md., and one of the same size for the Atlas Engine Works, Indianapolis, Ind.; one 150-pound hammer for the United Fruit Company for export, one 50-pound hammer for the Boston Ice Company, Boston, Mass., and one 50-pound hammer for the Buffalo Spring & Gear Company; an 80 and a 50-pound power hammer is also to be furnished J. H. Mann, Lewistown, Pa., for upsetting axes, and a 50-pound hammer is building for Selig, Sonnenthal & Co., London, England.

Thomas P. Conard advises us that business is very active in the machinery line, and has recently made the following sales: One 25-ton standard gauge locomotive to a Georgia buyer and one 30-inch gauge locomotive to an Illinois concern, four 150 horse-power and three 80 horse-power boilers to coal operators near Pottsville, a pair of 24 x 48 inch hoisting engines to another coal company and a pair of 9 x 12 inch engines to a Scranton buyer. Also 900 tons of relaying rails to Pittsburgh and other parties.

The Cleveland Machinery Market.

CLEVELAND, OHIO, November 26, 1901.

Cleveland machinery dealers are much interested in a list of tools wanted, which has just been sent out by Superintendent of Motive Power Marshall of the Lake Shore & Michigan Southern Railway, being the requirements in the machine tool line for their new repair shops which are being erected at Collinwood, near Cleveland. The shops will be among the largest of the kind in the country, and will take care of the repair work for several divisions of this road. The list includes iron working tools of all kinds. A number of varieties of tools are specified, so that it is probable that the order will be well scattered.

The business during the past month has been very satisfactory to every one interviewed. Possibly the volume of large contracts was not as large as for October, but the aggregate shows up well. Some very good things are in sight, as a number of leading concerns are at work on or making plans for additions which will mean good business after the first of the year. It is remarked by several people that money is easier and collections better than they have been for several months back. One of the branches of the manufacturing trade, which seems to be particularly active at this time, is the automobile trade. A new plant of considerable size is to be started in the near future, and the existing concerns are making extensions. Two prominent local concerns are making shipments of tools to the Philippines.

The S. M. York Machinery Company say that November has been a very satisfactory month, but not quite as good as the preceding month. They have several very good sized lots of tools, among them four complete repair shop equipments for four beet sugar plants

which the Kilby Mfg. Company are building, the contract aggregating about \$10,000, and a complete machine shop equipment for a new transportation company, who are building a repair shop and docks at Manila, Philippines. Cleveland people are interested in the concern. The York Company have just become agents for the Fellows Gear Shaper Company of Springfield, Mass., and have sold one of their 36-inch gear shaping machines to local parties.

Strong, Carlisle & Hammond report an excellent month both in their machine tool and engine departments. They have just sold a second large bill of tools to the Kuhlman Car Company of Cleveland, aggregating about \$12,000; a complete equipment of machine tools to the Niles Car & Mfg. Company, Niles, Ohio; tools aggregating about \$20,000 to the Olds Motor Works, Detroit, Mich., and about 25 tools to the Port Huron Anvil & Thrasher Company, Port Huron, Mich. They have also sold to the Acme Machinery Company a Skinner automatic engine, 165 horse-power; to the City Foundry Company, Cleveland, a Skinner automatic engine, 150 horse-power, and to the Ohio Iron & Steel Specialty Company, Cuyahoga Falls, Ohio, a 250 horse-power Atlas Corliss engine and Atlas boilers. They are furnishing the Wm. L. Otis Company, Cleveland, with an equipment of American wood working tools.

The Marshall & Huschart Machinery Company say that October was the best month in the history of the Chicago and Cleveland stores. This month there have been fewer large equipments, as people are already harping on the "first of the year" argument, but the aggregate of the small business and single orders has been very satisfactory. The local office stumbled on a nice order in the shape of \$40,000 worth of tools for a Tiffin, Ohio, concern. The buyer visited the various factories represented by the company, and selected the desired machines from stock, so that the order was filled in less than three weeks. This is considered something remarkable in these times in view of the fact that they are from 60 to 90 days behind on a great many tools which they handle. They have just taken a good sized order for tools for the American Shovel & Stamping Company, Lorain, Ohio. They have taken the agency for a new line of wood trimmers manufactured by the Fox Machine Company, Grand Rapids, Mich.

The Winton Motor Carriage Company on December 1 will open branch stores at Chicago, Boston, Philadelphia, Denver, San Francisco and Washington, and agents have been appointed in a number of large cities. They are taking orders for spring delivery, and have sold more than enough to keep them busy until April 1.

The Cleveland Punch & Shear Works Company say that the demand for heavy machine tools in their lines appears to be growing each month. They have recently shipped the following large tools: Atlas Engine Works, Indianapolis, one 36-inch throat punch weighing 16,000 pounds; Ritter-Conley Company, Pittsburgh, a 50-foot plate planer, weight 56,000 pounds; Hay Foundry & Iron Works, Newark, N. J., one double punch, 36 and 40 inches, motor driven; Norfolk Navy Yard, one 30-inch throat punch; Vereinigte Kammerische Werke, Berlin, one 15-foot arm radial drill; Garry Iron & Steel Company, Cleveland, one No. 3 angle shear, motor driven; Camden Iron Works, Camden, N. J., one Cleveland rotary planer, 50-inch cutting head, 20-foot bed, motor driven; Standard Harrow Company, one 20-inch throat punch; Lake Erie Torpedo Boat Company, Bridgeport, Conn., one 8-foot arm radial drill; Shipowners' Dry Dock Company, Chicago, one bending machine. They have the following on their books or under construction: One 26-inch punch, Vincennes Bridge Company, Vincennes, Ind.; one 10-inch throat punch, Western Iron & Steel Company, Lake View, Washington; one 15-foot bending rolls, engine driven, Girard Roller & Mfg. Company, Girard, Ohio; one 10-spindle drill, the James H. Baker Mfg. Company, Tarentum, N. J., and one set of straightening rolls and one 42-inch double punch and shear for the United States Navy Department for shipment to Manila, Philippines.

The Ajax Mfg. Company, manufacturers of forging and upsetting machinery, say the demand for their goods

is at present heavier than ever before. The number of their orders coming from railway and shipbuilding shops is very large, and they are also furnishing several complete shop equipments for the production of bolts and rivets. To take care of this increased business they are rearranging their shop, and are more than doubling the facilities by installing new machinery. Much of it has been installed, and they expect to add more after the first of the year. They are furnishing several of a new style of riveting machine to the Champion Rivet Company, Cleveland, and several to the Samuel Severance Spike & Rivet Company, Pittsburgh. They are building two large solid die rivet machines and two nut machines for the Diamond State Steel Company, Wilmington, Del., and their shop is full of their regular lines of upsetting and forging machinery. One of the largest contracts they have ever secured has recently been completed, being a complete outfit of automatic riveting machines, bolt cutters, upsetting machines, &c., for the Eclipse Mfg. Company, Pittsburgh. It is claimed that this concern now have one of the most complete plants of its kind in the country for the production of bolts, rivets and forgings. C. P. Theis is general manager of the Eclipse Mfg. Company.

The Acme Machinery Company say that November has been one of the best months of the year, although during the past few days they note a tendency among buyers of starting the annual cry about holding off until after the first of the year before placing contracts. They say that judging from inquiries being received this will be the best winter in their history. They have recently installed considerable new machinery, which has necessitated increasing the capacity of the power plant; contracts for the new equipment have just been closed.

The Chisholm & Moore Mfg. Company are increasing their facilities largely, and they will shortly be on the market for considerable new machinery. They are rearranging their entire plant and have just commenced work on two new buildings, one 30 x 145 feet, two stories, to be used as a machine shop, and another, 63 x 125 feet, to increase the facilities of their crane department. They are also preparing plans for a large addition to their foundry, but this will not be built until next spring. The demand for their cranes is now heavier than ever before, and they have recently closed the following contracts: Four 5-ton pneumatic cranes for Battle Creek, Mich.; two 30-ton pneumatic cranes for Indianapolis; one 10-ton pneumatic crane for Hammond, Mo.; one 10-ton pneumatic crane for Buffalo; one 25-ton pneumatic crane for Augusta, Ga.; one 15-ton hand power crane for Muskegon, Mich.; two 4-ton pneumatic cranes for Providence, R. I., and one 25-ton hand power crane for St. Mary's, Ohio. In their pneumatic hoist department they are far behind on orders.

The Columbian Hardware Company, who succeeded the Van Wagoner & Williams Company, are just completing some extensive alterations and improvements. They are rearranging the entire plant and have installed much new special machinery, while considerable more is still to be purchased. They have built a new power plant and equipped it with new engines, boiler, generator, smoke consumers, &c. They state that all of their lines of hardware are selling well, and the outlook appears most promising. Shortly after the first of the year they will announce several new lines of hardware specialties on which they are now at work.

The Cleveland office of the Babcock & Wilcox Company has closed a contract for a battery of 2000 horse-power boilers for the Forward Reduction Company, Cleveland, who are erecting a sulphur plant, near Beaumont, Texas.

E. P. Roberts & Co., Electric Building, contracting electrical engineers, are securing estimates on the equipment of a power house for the Muncie, Hartford & Ft. Wayne Electric Railway, which they are building.

The Boley Wire Fence Company of Sandusky have been organized with \$30,000 capital, stock all paid in, with Jacob Kuebler, Cleveland, president; A. E. Chapelka, Cleveland, vice-president; E. H. Penning, Cleveland, treasurer, and Max Boley, Cleveland, secretary

and general manager. Mr. Boley was formerly prominently identified with the American Steel & Wire Company, and the new company will manufacture wire fencing, utilizing a machine recently invented by Mr. Boley. Arrangements have been made for a factory building in Sandusky, and work is to start at once.

The Aultman & Taylor Company of Mansfield have made a proposition to buy up the plant and equipment of the Mansfield Machine Works, Mansfield, which was placed in the hands of a receiver some time ago. It is stated that \$65,000 is offered for the property.

The Lake Erie Specialty Company of Geneva, Ohio, have been incorporated with \$10,000 capital stock and have bought out the brass working department of Knapp & Pratt, that city. The business is to be expanded and a new factory erected.

The Krastin Automobile Mfg. Company have been incorporated with \$200,000 capital stock to manufacture hydrocarbon automobiles, and they are preparing plans for the erection of a large factory in Cleveland, which they state will employ 200 men.

J. N. Richardson, architect, is preparing plans for the new plant of the K. D. Box & Label Company. The building will be five stories of brick and steel. Inquiries are being made for an engine, boilers, generator and other power house equipment.

The Variety Iron Works are just completing their new machine shop, which is one of the largest in the city. They will equip it with a portion of the machinery now employed in their No. 1 plant, which is in another part of the city from the new plant. They will also buy some new tools. Business is reported exceedingly prosperous, and they are scarcely able to take care of the business received.

New machinery which will nearly double their present capacity is being installed by the Cleveland Rivet & Forging Company, who commenced business some months ago. They make a specialty of rivets, and at present are considerably behind on orders.

The Baker Motor Vehicle Company have commenced work on their new plant, which is to be five stories, 50 x 140, and they will shortly close contracts for their machinery.

C. A. Boyd, a prominent engineer, who has spent the past two years in installing a plant for the Dick-Kerr Company, England, has returned to his home in Cleveland. Mr. Boyd was for many years connected with the Walker Mfg. Company, Cleveland.

As a result of the recent inspection of the Warren (Ohio) rolling mill by leading officials of the United States Steel Corporation, it is stated the mill is to remain in Warren. The plant is to be equipped with an electric lighting plant, new automatic roll machinery, new engines, and a new yard crane engine. The 10-inch mill will be placed on skelp run, it is stated.

The New York Machinery Market.

NEW YORK, November 27, 1901.

Unchanged conditions characterized the week under review. General demand has increased somewhat in almost all lines and the tendency toward stiffening has become more pronounced. The situation, on the whole, continues to show greater signs of strength. The extraordinary activity which affected the West a short time ago and which still continues there is now being felt in these quarters. Merchants and machinery builders in this section of the country are receiving urgent inquiries from the West. This comes as an overflow from concerns desirous of closing immediately but unable to secure deliveries from the Western shops.

Machine Tools

are very scarce as regards the heavier types. Builders of the large sizes of almost all classes of tools report that they are constantly involving themselves in deeper trouble by taking a greater amount of business than their shops are capable of producing. Large boring mills, radials, planers and heavy punching and shearing machines are quoted at from six months to a year distant delivery. Good second-hand tools of this description are being quickly snapped up by anxious purchas-

ers. Machinery dealers are taking up such second-hand tools whenever they can obtain them, so as to be able to loan them to purchasers until the new tools ordered are delivered. A good deal of complaint is heard from consumers over the fact that machines that should have been delivered weeks ago are overdue. Naturally under such conditions prices do not sag in the least. On the contrary, the concessions which under ordinary business conditions are allowed at a pinch are being entirely eliminated. Several of the builders of heavy tools are extending their own works and are now drawing on their own products for the equipment of these additions to their plants. As regards the smaller types of standard tools, the market is not so severely taxed, although a good, steady consumption prevents the builders or merchants from accumulating any considerable stock. In the case of certain enterprising concerns who specialize in the building of a particular type of tool the shops are now running at their fullest capacity with an endeavor to get abreast of the orders. Heretofore such firms have supplied the demand almost entirely from stock. In one line of this character, milling machines, the demand seems to be running in the direction of the heavier sizes. The meeting of this trade requires the installation of heavier machinery at the works. That the owners do not look for an early curtailment of this demand is attested by the fact that they are making the requisite changes at their plants with their customary vigor.

Some of the larger machinery houses in this city are working on a very large proposition which is expected soon to be in shape for announcement. This transaction will be the first large export deal consummated in some time. Regarding the general foreign demand, there is no change. Nor is there indication of an early resumption of activity. The representative of an important German machinery house, who is now in this country, stated yesterday that when he left Berlin he heard rumors of a probable closing down of some of the large machine tool factories in that vicinity. One of these concerns are a large establishment building American machinery entirely. Another well-known German company, he said, have been putting partly finished machines in storage for some time, as they could not find an outlet for the tools finished and in stock. This factory was also to close down for a period.

For domestic account, one of the largest propositions now before the trade emanates from the Hooen, Owens & Rentschler Co., the large Corliss engine builders, of Hamilton, Ohio. The fact that this concern were extending their works on a very elaborate scale was previously mentioned in this column. Now they are up to the matter of equipment and are looking into the matter of machine tools. A representative of this company is about to make a tour of the large up to date shops throughout the country in order to see the working of several special machines and shop systems that are under consideration for adoption in the new shops.

Orders to the extent of \$30,000 are to be placed for machinery by M. H. Treadwell & Co. of 85 and 87 Liberty street. At a recent meeting of the directors of the company it was decided to expend this amount in equipping new property. The company have for some time been operating and in control of the Stoeber Foundry & Mfg. Company of Myerstown, Pa. Their product is freight and cinder cars, open hearth ladles, ingot and hot metal cars and similar machinery. They have just acquired the works of the Lebanon Mfg. Company of Lebanon, Pa., and are now about to improve the plant. One of the chief extensions will be a large new foundry. They will also require air tools and special machinery, as well as heavy machine tools. There is also a fair amount of machinery to be purchased on a previous appropriation in connection with a new machine shop, which is being added to the Stoeber Works at Myerstown. John H. Killenger is president of the company and M. H. Treadwell is vice-president.

The Ritter-Conley Mfg. Company of Pittsburgh are now looking into the matter of equipment for the new steel barge plant which they are to erect at Leetsdale,

Pa. A 300 horse-power gas engine has been purchased from the Westinghouse Machine Company.

The Michigan Central Railroad are considering the building of a large repair shop. The location has not been decided upon as yet. The matter is in the hands of a prominent New York engineering firm.

Boilers, Engines and Accessories.

Mechanical Engineer John Van Vleck of the Subway Construction Company, twenty-fourth floor, Park Row Building, has just issued the specifications for the condensing apparatus to be installed in the monster power station which will supply the electrical current for the New York subway. There are to be eight condensing equipments, each having a capacity of from 7500 to 11,000 horse-power. No definite date has been set for receiving bids, but purchases will be made as soon as all bids are in. Aside from the great electric power stations now in course of erection in this city, the power plant of the White Mountain Paper Company will be the largest erected in this vicinity in many a day. That is, provided the present plans of the incorporators are carried out. J. C. Morgan is now arranging for bids on the equipment. Mr. Morgan stated to a representative of *The Iron Age* that he is asking bids on 20,000 horse-power of water tube boilers, 20 300 horse-power simple engines, two 1800 horse-power tandem compound condensing engines, seven 1200 horse-power tandem compound condensing engines, one 1200 horse-power cross compound condensing engine. To this apparatus is to be added all of the requisite condensing apparatus and accessories. The purchases, Mr. Morgan said, will be made from time to time prior to March 1. The new plant or plants of the company are to be located in the vicinity of Portsmouth, N. H. There will also be water power aggregating 15,000 horse-power, to be developed under heads of from 30 to 80 feet. This will require water wheels, penstocks and electrical apparatus.

The White Mountain Paper Company were recently incorporated with a capital of \$15,000,000, and a bond issue of \$10,000,000. The organization has not yet been completed, but it is said that the company are backed by strong financial interests. Mr. Morgan was the founder of the Niagara Falls Paper Company. He built the plant, and, after its absorption, became nominally a district manager for the International Paper Company. He has offices at present in the Bourne Building, 85-87 Liberty street.

Two extensive electric railway projects are under way in upper New York State. It is expected that they will be considering the matter of equipment in the early spring. Both are to operate in the vicinity of Buffalo and Rochester.

The Genesee & Orleans Railroad Company intend connecting Batavia, Albion and Oak Orchard, a summer resort on Lake Ontario. It is also contemplated to extend south from Batavia to Attica. The Buffalo & Williamsville intend extending from Buffalo to Batavia, and thence to Rochester, connecting the intervening towns between Buffalo and Rochester.

The Duncan Company, manufacturers of paper, Mechanicsville, N. Y., are improving their power plant. They have ordered 3000 horse-power of Wainwright heaters to condense all auxiliary steam of the plant. The sale was made by Henry C. Palne, New York sales agent of the Taunton Locomotive Mfg. Company, of 85 Liberty street.

The Union Pacific Railroad Company have ordered from Westinghouse, Church, Kerr & Co. ten 25 horse-power engines direct connected to Westinghouse generators, for the purpose of furnishing electricity for lighting fast express trains. The latter concern have also booked an order for 32 Roney stokers, aggregating 8000 horse-power, to be installed by the Lackawanna Iron & Steel Company of Buffalo, N. Y.

H. E. Maxfield, New York representative of the Lawrence Machine Company, of 39-41 Cortlandt street, received an order from the Weston Electrical Instrument Company of Waverly, N. J., for a large centrifugal pump to be used in the hot water heating system employed in the plant.

The North Jersey Street Railway Company of Ex-

change place, Jersey City, are considering the erection of a large new power station in connection with installing a high tension system.

Naval Supplies.

The following action has been taken during the week on bids, recently opened, for naval supplies:

Norfolk yard, opened October 29, classes 50 and 52, to Bement, Miles & Co.; 51, Manning, Maxwell & Moore; 55 and 56, Henry Walke Company; 54, Smith-Courtney Company; 53, not decided. All others to lowest bidders.

Mare Island, opened November 5, to lowest bidders.

Boston, November 12, and Pensacola and Washington, November 19, not decided.

The following material is required for delivery at the Mare Island Navy Yard, bids for which are to be opened December 17 at the Bureau of Supplies and Accounts, Navy Department:

One 30 horse-power motor, one 25 horse-power motor, one 15 horse-power motor, one 10 horse-power motor, semi-inclosed, belted type; one 10 horse-power motor, wholly inclosed, belted type; one 10 horse-power motor, wholly inclosed, direct connected; one 10 horse-power motor, semi-inclosed, belted type; one 7½ horse-power motor, wholly inclosed, belted type; one 7½ horse-power motor with subbase, idler jack and controlling panel; one 5 horse-power motor, one 3 horse-power motor, wholly inclosed; one 3 horse-power motor, semi-inclosed.

Sealed proposals will be received at the Bureau of Yards and Docks, Navy Department, Washington, until December 28, for furnishing and installing two 275 horse-power boilers and accessories at the Navy Yard, Bremerton, Wash. Plans and specifications can be seen at the navy yard named, or will be furnished by the bureau. Mordecai T. Endicott, chief of bureau.

Sealed proposals will be received at the Bureau of Yards and Docks, Navy Department, Washington, until December 28, for constructing two coaling towers with necessary coal handling machinery at the naval station, San Juan, P. R. Estimated cost, \$20,000. Plans and specifications can be seen at the naval station named, or will be furnished by the bureau. Mordecai T. Endicott, chief of bureau.

Calamitous Boiler Explosion.

A boiler in the rear building of the factory of the Penberthy Injector Company, Detroit, Mich., exploded at 9.30 a.m. on Tuesday of this week with such force that it demolished the building, a three-story brick structure. Some 50 persons were at work in this building, all of whom were more or less seriously injured, and at least 26 were killed.

The rear building was 54 x 100 feet in size. It was separated from the large structure adjoining by a 16-foot alley. As stated, the explosion completely wrecked it and blew in a portion of the wall of the other building. No one in the latter was seriously hurt excepting one girl.

There were four boilers in the plant, two horizontal and two vertical ones. It was one of the horizontal boilers that exploded.

The floors and roof of the rear building bulged upward and then crashed down with their heavy loads of machinery and foundry apparatus. Walls, roof and all dropped into a shapeless mass of debris. Windows in houses for a block around were broken by the concussion and flying bricks filled the neighboring yards.

The property loss is about \$180,000. The firm carried \$70,000 fire and some boiler insurance. The boilers had been recently inspected, and the engineer was known as one of the most careful and capable men in the city.

The Neale & Levy Ship & Engine Building Company, Philadelphia, Pa., successfully launched on the 23d inst. the passenger steamer "Calvert," building for the Weems Steamship Company, Baltimore, Md. When completed the steamer will ply between Baltimore and points along the coast. Her dimensions are 190 feet long, 44 feet beam and 11 feet 6 inches deep. She will be equipped with one compound engine, 20 and 40 inch cylinders with 28-inch stroke. Two Scotch boilers 14 feet 9 inches by 12 feet will furnish the steam.

HARDWARE.

The present tone and tendencies of business emphasize the importance of houses, whether in the manufacturing or merchandising branches of the trade, having and maintaining a high standard of business methods, not only in the management of their internal affairs, but also in the relations with the trade at large. It is, perhaps, inevitable in connection with the growth of establishments or the consolidation of many into one that there be, as we have before pointed out, more or less of the elimination of the personal relation between the sellers and the buyers of goods, but with this there should be an increased promptness and efficiency of service and careful attention to all the details of correspondence. Shortly after the organization of some of the great consolidations in Iron and Hardware lines there was much complaint at the dilatory and unbusinesslike attention given to letters, and even to telegrams, thus increasing unnecessarily the difficulties of trade and adding to its wear and tear. Our readers will remember the protest which was raised against the practice, for which some excuse was found because of the practical difficulties of establishing and working the entirely new system which was requisite in view of the bringing together of a number of widely separated plants and under new trade conditions. The grounds for complaint on the part of the merchant have, however, in very large measure been overcome, and most of the consolidations take their place among the best conducted concerns in the trade.

An illustration of the spirit which is prevailing among them is given in the case of one corporation who make a point to conduct their correspondence on what they term the quick order; in the matter of making quotations or answering general letters it is a rule that their entire mail be disposed of on the day received. Where they find it necessary to get information from any of their factories their system is to have the local manager of that factory, who is thoroughly qualified for the position and understands the art of correspondence and business usage and proprieties, reply to the customer direct from the factory. When they must reply to telegrams they telegraph the factory concerned by code, and the factory in turn telegraphs their customer fully in reply to his inquiry. Such a policy and the satisfactory service which results from it cannot fail to be appreciated by the trade. It will doubtless as a rule be found that a successful house which occupies anything of a prominent position in the trade has won its position and extended its business largely by the attention given to rendering its customers the best service in matters of this kind.

The principle under consideration applies obviously to merchants as well as manufacturers, and to the small as well as to the large houses, in proportion as they are brought into contact with the trade through correspondence. If there is reason for criticism on account of any lack of attention to this matter by large manufacturers, there is doubtless more ground for it in connection with the business methods of merchants occupying a narrower field and a less important position. The great houses almost necessarily have good methods and are characterized by care and promptness in their dealings with the trade, but with many merchants, who succeed indeed in making a living, there is sluggish movement and slipshod methods. With alert management, prompt-

ness in all relations with their trade and careful attention to all details of inquiries there would be a strengthening of their hold on their customers and a constant increase in their number. It is in direction of matters of this kind that personality will continue to assert itself and business ability to conquer success.

Condition of Trade.

The past week has been comparatively uneventful, as business has run along in regular channels without any important change in general features of the market or in the prices of leading goods. The activity which has prevailed continues without interruption, and manufacturers and merchants, from the producers of the raw material down to the retailers of the finished goods, are fully engrossed in attending to the demands of current business. There is thus on all sides a very satisfactory condition of things. The lines in which the larger volume of business is doing are season goods on which the jobbers and larger retailers are covering their requirements for next year. Steel Goods, Lawn Mowers, Scythes, Freezers, Refrigerators, Window Screens, Wire Cloth, Poultry Netting, &c., are thus receiving the careful attention of buyers. In this class of goods many of the jobbers are endeavoring to secure the orders of the better class of retail merchants who order well in advance of their requirements, and at relatively close prices on many of these lines, which in some cases cover delivery. The tone of the market is very steady, and in some lines is decidedly strong. The firmness of the iron market and the difficulty which manufacturers experience in obtaining raw material have a perceptible effect on Hardware prices. There is little buying beyond expected requirements, in anticipation of advances, and there is thus little speculation going on, but there is a confident feeling that most goods can be bought with safety, and the probability that in some lines there will be more or less of a shortage has influence in inducing merchants to place orders early and for liberal quantities.

Chicago

(By Telegraph.)

Local architects are extremely busy on plans for next year. One architect remarks that from the prospective builders' standpoint it is only a question whether he can get the structure erected next year, the amount of work in view is so large. There are special reasons for greater coming activity at Chicago than elsewhere perhaps, the strikes two years ago and other drawbacks restricting the constructing during the past two or three years, but the outlook for 1902 in the building line is generally excellent. Some of the local Hardware jobbers say they are taking many orders for spring deliveries, others that they are not. The buying of that nature is not phenomenal, and special activity is not universally looked for until January. There is, however, enough of it in progress to give countenance to high hopes for next year. Some sellers of Skates report better orders this week. Dealers who have not carried over a stock are preparing for the ice, which often comes Thanksgiving week or shortly after, and Skates are always wanted by the Hardware trade about that time. The aggregate volume of present trade is large for the close of November, considerably ahead of last year at this time. Heavy Hardware is moving evenly and without interruptions.

St. Louis.

(By Telegraph.)

The Hardware market holds its position well for activity and healthy tendencies, and although this is the time for calling in salesmen for instructions and equipment for the new year, the slackening in demand which is usually noted at this season has not been felt as yet. The continuation of the mild weather is likely the most

important factor aiding the market now, and the result of a good cold spell would be looked upon to check the activity. No new features in prices are to be noted; the irregularity in certain lines which have received attention in our reports still continues. Seasonable goods are in very active demand, and a good trade can be mentioned in Poultry Nettings. Prospect for spring trade is considered of the best order, and some good business is now on the books for 1902. In the heavy department of the market a slackening in the demand is reported, but a quieter feeling is always manifest as the year draws to a close. Stock taking will soon be in order and the change is not an unwelcome one to the Heavy Hardware jobbers.

NOTES ON PRICES.

Wire Nails.—The demand for Wire Nails continues in about the former volume, orders being still for such lots as are needed to supply current demands, but the aggregate volume is very satisfactory. In the matter of prices the situation has not changed since our last report, and quotations are substantially the same as a week ago. The leading manufacturers are meeting legitimate competition, but are disregarding quotations where deliveries cannot be made. Many of their customers are sending in their orders with confidence that they will be protected in the matter of prices. The market is represented in a general way by the quotations of \$2.15 to \$2.25, in carload lots, f.o.b. mill. In the prices made by jobbers to smaller merchants differentials between jobbers' and retailers' prices are not usually maintained, and the manufacturers who have recently entered the market are not observing any uniform rule regarding prices to the larger or smaller trade.

New York.—The local Wire Nail market shows no change in general conditions. There is more or less irregularity in prices and the market is represented in a general way by the following prices: Small lots from store, \$2.35 to \$2.40; carload lots on dock, \$2.25.

Chicago, by Telegraph.—In the matter of volume the Wire Nail trade is entirely satisfactory. It is somewhat better than normal, and is absorbing the output of mills with rather remarkable completeness. But there is the underlying doubt about stability of prices, which is restricting purchases to immediate needs. While the large trade from mill is without change of quotation, there is less certainty concerning store prices. Nominally small lots remain at \$2.40 to \$2.45, with little or no carload business.

St. Louis, by Telegraph.—A very fair business is reported in the market for Wire Nails, and the same level of prices, \$2.40 to \$2.45, quoted last week will apply.

Pittsburgh.—There is only a fair demand for Wire Nails, and mostly for small lots, buyers evidently intending to pursue the policy of buying only as their immediate necessities demand. The tone of the Wire Nail market continues weak, and concessions in prices are easily obtainable on carloads and larger orders. Nothing has yet been done in regard to fixing a price agreement on Wire Nails among the leading mills. We continue to quote Wire Nails at about \$2.15 in carload lots, and \$2.20 to \$2.25 in less than carloads, f.o.b. Pittsburgh.

Cut Nails.—At a meeting of the Cut Nail Association held last week existing prices were reaffirmed for the month of December. It is understood that an insignificant minority at first proposed a reduction in price, but that the large majority saw no reason for making any reduction, and the meeting decided unanimously to reaffirm prices. The opinion is expressed that this action will inspire buyers with increased confidence in the market. Steel continues high in price and difficult to obtain. Scarcity of freight cars is still interfering with the shipment of raw materials, as well as with that of the finished product. Quotations are as follows, f.o.b. Pittsburgh, plus the actual freight to point of destination, terms 60 days, or 2 per cent. off in 10 days: Carload lots.....\$2.05 Less than carload lots..... 2.10

New York.—Local demand for Cut Nails continues normal, while the market shows increased firmness. Rep-

resentatives of mills are adhering to the price of \$2.25 for Nails from store, while jobbers, in some instances, are selling at 2 cents below these figures. New York quotations for carload and less than carload lots are as follows:

Carload lots on dock.....\$2.18
Less than carload lots on dock..... 2.23
From store.....\$2.23 to 2.25

Chicago, by Telegraph.—The firmness shown in Cut Nails limits business, because of the reduced differential. Quotation remains at \$2.35 for small lots.

St. Louis, by Telegraph.—The conditions in the market for Cut Nails are unchanged since our last report, and price quotations remain the same. Small lots from store are quoted from \$2.30 to \$2.35.

Pittsburgh.—In view of the low price of Wire Nails there is a falling off in demand for Cut Nails, many former buyers of Cut Nails now buying Wire Nails. The tone of the market is strong. We quote for domestic trade, f.o.b. Pittsburgh, plus Tube freight to point of destination, terms 60 days, or 2 per cent. off in 10 days:

Carload lots.....\$2.05
Less than carload lots..... 2.10

Barb Wire.—As the season advances there is a continued falling off in the demand for Barb Wire. Concessions in price are made on good orders, owing to reduced consumption and full stocks at mills. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots, Painted.....\$2.60
To jobbers in carload lots, Galvanized..... 2.90
To jobbers in less than carload lots, Painted..... 2.65
To jobbers in less than carload lots, Galvanized.... 2.95
To retailers in carload lots, Painted..... 2.70
To retailers in carload lots, Galvanized..... 3.00
To retailers in less than carload lots, Painted..... 2.80
To retailers in less than carload lots, Galvanized... 3.10

Chicago, by Telegraph.—Prices for Barb Wire are nominally unchanged, but are being shaded. There is continued good buying in the Southwest. Carload lots are quoted at \$2.75 for Painted and \$3.05 for Galvanized. Less than carloads are quoted \$2.85 and \$3.15 respectively, with these prices firmly held.

St. Louis, by Telegraph.—The volume of inquiry and demand for Barb Wire is reported very fair for this time of the year, and we note no change in prices. Jobbers quote carload lots of Painted at \$2.75, and Galvanized at \$3.05; less than carload lots at \$2.80 for Painted and \$3.10 for Galvanized.

Pittsburgh.—The market is quiet, and will probably continue so until spring trade opens up. We note continued unevenness in prices of Barb Wire, and concessions are being made right along on carload orders and larger lots. For domestic trade established prices are as follows: Galvanized Barb Wire, \$2.90 in carload lots to jobbers, and Painted, \$2.60. Terms 60 days net, 2 per cent. discount for cash in 10 days, f.o.b. Pittsburgh. However, the above prices do not longer accurately represent the market, but are being shaded.

Plain Wire.—Jobbers as a rule have not begun placing contracts for Plain Wire for spring delivery. Manufacturers of Wire products are anticipating a large business for next year, and are placing orders for their Wire. Prices continue irregular on desirable orders. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. off for cash in 10 days:

Base sizes.	Base.	Plain.	Galv.
To jobbers in carload lots.....	\$2.25	\$2.65	
To jobbers in less than carload lots.....	2.30	2.70	
To retailers in carload lots.....	2.35	2.75	
To retailers in less than carload lots.....	2.45	2.85	

The above prices are for the base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

Base.	Base.	Plain.	Galv.
6 to 9.....	\$0.40 extra.		
10.....	\$0.05 advance over base.....	.40	"
11.....	.10 " " " ".....	.40	"
12 and 12½.....	.15 " " " ".....	.40	"
13.....	.25 " " " ".....	.40	"
14.....	.35 " " " ".....	.40	"
15.....	.45 " " " ".....	.75	"
16.....	.55 " " " ".....	.75	"
17.....	.70 " " " ".....	1.00	"
18.....	.85 " " " ".....	1.00	"

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

Chicago, by Telegraph.—There is comparatively little new call for Plain Wire, though shipments continue large on old orders. Prices are unchanged. Carload lots of Wire are held at \$2.40 and small lots at \$2.50.

St. Louis, by Telegraph.—A fair demand is reported by the jobbing trade for Plain Wire and the quotation for No. 9 is \$2.40 to \$2.45, and Galvanized \$2.80 to \$2.85, with the usual advance for other sizes.

Pittsburgh.—Makers of Fence and Poultry Netting are placing large orders for Wire, having sold large quantities of their goods for delivery next year. Prices are uneven, and are being shaded more or less, depending on the order and point of delivery. Regular quotations are:
To jobbers in carload lots.....\$2.25
To jobbers in less than carload lots..... 2.30
To retailers in carload lots..... 2.35
To retailers in less than carload lots..... 2.45
Galvanized Wire up to No. 14 is 40 cents advance on Plain; Nos. 15 and 16, 75 cents advance, and Nos. 17 and 18, \$1 advance. Terms are 60 days net, with 2 per cent. off for cash in 10 days, f.o.b. Pittsburgh.

Polished Split Steel Key Rings.—A. Klein, 453-455 Broome street, New York, is the sole sales agent in the United States for a complete line of Polished Split Steel Key Rings, made in Austria by a secret process, the marked characteristics of which are referred to as their fine polish and anti-rust quality. Manufacturers take them in solid sizes in bulk, but for the Hardware and fancy good trades they are put up 1 dozen on a card, 12 cards in a box, and sold from the list herewith, from which the jobbers get a horizontal rebate of 10 cents a gross. The more staple styles are SH, I, F, G, P, K, Triangle and Heart. The sizes are given in millimeters, 25 of which are approximately the equivalent of our inch. The following is the list, solid sizes in bulk being sold from a separate list:

	Per gross.	Millimeters.	
SH	\$0.74	4 sizes, 23 to 37	Medium weight, high grade.
SW .....	.66	4 " 23 to 37	Medium weight, ordinary grade.
LH .....	.70	4 " 23 to 37	Light weight, high grade.
LW .....	.61	4 " 23 to 37	Light weight, ordinary grade.
G .....	.93	4 " 25 to 38	Fancy high grade.
P .....	.93	4 " 25 to 38	" " "
K .....	.93	4 " 25 to 38	" " "
A .....	.93	4 " 25 to 38	" " "
I	1.02	3 " 28 to 38	Heavy weight, high grade.
F	1.55	4 " 32 to 46	Heaviest " " "
FLAT	1.20	4 " 27 to 40	Fancy " " "
HEART ...	1.65	1 size only.	Fancy heart shape, high grade
LOOP	1.80	" "	Fancy high grade.
OCTAGON.	1.55	" "	" " "
SOUVENIR.	1.95	" " Steel	" " "
SOUVENIR.	2.10	" " Colors	" " "
SOUVENIR.	2.30	" " Half gilt or silvered	" " "
SOUVENIR.	2.70	" " All gilt or silvered	" " "
		Millimeters.	Per gross.
SH		4 sizes, 25 to 38.....	.76c.
LH		4 sizes, 25 to 38.....	.73c.
LW		4 sizes, 25 to 38.....	.65c.
SW		4 sizes, 25 to 38.....	.68c.
LH		4 sizes, 30 to 40.....	.84c.
LW		4 sizes, 27 to 40.....	.70c.

Sash Weights.—The manufacturers of Sash Weights are working together with a good deal of harmony, and in view of this fact, as well as the large demand and the strength of the Iron market, prices for Sash Weights have recently been advanced. The market is still decidedly strong and the tendency upward. Stocks are very much reduced both East and West, and the foundries are busy on current orders. Present prices are represented by the quotation of \$21 per ton, but some manufacturers are holding at \$22.

Registers.—There is considerable diversity among Register manufacturers as to the list used by them. A majority are using the list bearing date September 2, 1901, but some are still using the old list. The volume of business has been large, but prices in many cases have been so low as to yield only a narrow margin of profit. There is no agreement among the manufacturers in regard to prices, and with active competition there is more or less irregularity in quotations. The manufacturers who have been in a position to fill promptly the orders of the trade have been able to secure better prices than others less favorably situated. There is a good deal of diversity in the quotations at which the goods are sold by the jobbing trade, among whom there is liberal cutting. Altogether the situation is not as satisfactory as the manufacturers would desire.

Emery.—Since the organization of the Ashland Emery & Corundum Company, in which the interests of many of the leading manufacturers of Emery are united, there has been little change in the market. The formation of the company, however, has had some effect in steadying prices, and the condition in this line is regarded as reasonably satisfactory to the manufacturers. The combination has not aimed to control the market, there being some large concerns outside. The chief object of the consolidation is to effect economy in the manufacture of Emery, and the company hope before long to be in a position to offer Emery at somewhat lower prices than have recently been current.

Cordage.—Business in Rope is of moderate proportions. Sisal Rope, on the basis of 7-16 inch and larger, is quoted by different manufacturers from 8½ to 9¼ cents per pound. Sisal Hemp now costs about the same price as the Rope is sold for. Many manufacturers, however, have Hemp on hand, bought at lower prices. Manila Rope, on the same basis, is quoted at 12¼ to 13 cents per pound. A rebate of ¼ cent per pound in large quantities is allowed on both kinds of Rope.

Glass.—As a result of the meeting held last week between the combined manufacturers and the jobbers' association, the prices of the latter to the trade were reduced to apply to the entire list of single and double strength, all over the country, as follows:

	Discount.
Less than car lots from store.....	.90 %
Carloads from store.....	.90 and 7½ %
Carloads, f.o.b. factory.....	.90 and 12½ %

Jobbers had evidently calculated upon a greater cut in price being made at this meeting, as Glass has been sold within the past week at from 90 to 90 and 5 per cent. discount. The future of the Window Glass market is uncertain, yet the fear of an open market much before January 1 is partially removed. Jobbers are expecting that Glass will be lower, and some are advising their customers to that effect. The combined manufacturers have not given the assurance that lower prices will not rule, which confirms this impression. No doubt many jobbers have stocks of Glass larger than they desire under existing circumstances, as is also probably the case with importers. Dealers have generally refused to pay 80 and 20 per cent. discount for small lots, and with lower prices possible the desire to unload both domestic and foreign Glass may further weaken the market. The jobbers' association placed an order with the combined manufacturers for 500,000 boxes for immediate delivery, sufficient, it is calculated, to carry them through the month of December. After this time, it is stated, the manufacturers expect that the association will be ready to place a new order. The price paid by the jobbers, it is understood, was 89 per cent. discount from the list of January 21, 1901, and that all orders placed since the middle of October, 1901, apply on this order and at the foregoing discount. The cut in price is, of course, intended to force the outside Glass manufacturers into some price agreement and avoid the threatened price war during the remainder of this fire. If the month of grace thus given does not produce the desired effect another cut will probably be made by the combined manufacturers. It is not known whether they, the American Window Glass Company and the Independent Glass Company, will renew their relations with each other when their present agreement expires. In fact, it is surmised that they have not themselves decided what they will do. While all Glass factories are in operation, it is estimated that the shortage of workmen all over the country averages about 35 per cent. Since the new discounts went into effect local prices from store have been cut, in some cases, to 90 and 10 per cent. discount.

Paints and Colors.—**Leads.**—Demand for White Lead in Oil for completing outside work has constituted the larger part of the business in the local market during the week. No change has been made in quotations, but reports of concessions of ¼ to ½ cent per pound are reported, according to brand. Quotations are as follows: In lots of 500 pounds or over, 6½ cents; in lots of less than 500 pounds, 7 cents per pound.

Oils.—*Linseed Oil.*—During the week the increase of available Linseed Oil has become marked, while consumption has shown a decrease, incident to the season. Prices have fallen off to 55 cents for City Raw in five-barrel lots or more, and to 53 cents for like quantities of out of town Raw. In less quantities, 1 cent per gallon additional is charged. Boiled Oil is 2 cents per gallon advance on Raw. Parties who placed contracts for Oil at low prices early in the fall are receiving the Oil from the mills. This Oil is now on the market and can be purchased in car lots for 51 to 52 cents per gallon. The Oil market has thus quickly changed from a strong position to a weak one, and a further decline in price would not come as a surprise.

Spirits Turpentine.—The market for Turpentine continues steady and quiet, with quotations unchanged. Large consumers appear to have their wants supplied for the present, and business is confined to small lots. The Southern market is steady and firm. Quotations at this point, according to quantity, are as follows: Southern, 37½ to 38 cents; machine made barrels, 38 to 38½ cents per gallon.

SUPPLEE HARDWARE COMPANY'S BUFFALO EXHIBIT.

The Lawn Mower exhibit of the Supplee Hardware Company, Philadelphia, Pa., at the Pan-American Exposition was located in the Stadium, where they used to the best advantage the small space allotted to them. Their Pennsylvania and Continental Mowers, which have occupied a prominent position in the market more than 20 years, were shown in beautifully decorated



Supplee Hardware Company's Buffalo Exhibit.

models. Also their new Pennsylvania Golf Mower, with six knives and a forward delivery grass box, which catches the cut grass in front of the machine. With this machine, it is stated, grass can be cut as close as ¼ inch, making it especially adapted to use on golf links, croquet grounds and fine lawns. They also exhibited their Pennsylvania Horse Mower, with forward delivery grass box. This machine is likewise furnished with a six-blade revolving cutter for special use on golf courses, &c. The Great American Ball Bearing Machine and examples of the New Departure, Belmont, Girard and Westfield machines completed the exhibit.

The marriage of William Phelps Lewis of the Hardware firm of Lewis & Creed, New Albany, Ind., and well known to the trade as president of the National Retail Hardware Dealers' Association, to Miss Alma Connor will take place in that city on the evening of December 4 at the Second Presbyterian Church.

Correspondence.

A NOVELTY IN CHECKS.

The various devices which originate in the fertile brains of the country financiers are oftentimes most interesting in their way.

Every one in business receives a great variety of checks, printed in many different sizes and forms. But it remained for a banker down South to provide his customers with a rubber stamp, to be used across the face of the check, reading, as follows:

"No Protest."

"Will not be honored unless inclosed by original payee direct to this Bank."

This is ingenious, to say the least. There is no checking off of this banker's balance on deposit in any other bank, which might be collecting this very check, no protest if payment was not exactly agreeable when it was received at the home bank.

It is needless to say that this modification of the usual meaning of the check was not very highly appreciated by our cashier, and it was returned to the customer with a request for something better in exchange.

It is to be hoped that whatever may be done in other lines the Hardware people will not pass any such check as even evidence of payment. All such should be duly returned to their originator.

HARD CASH.

TRADE ITEMS.

The committee of Cleveland manufacturers who had in charge the entertainment of the jobbers and others who attended the convention of the National Hardware Association recently held in that city have issued a pamphlet containing the proceedings of the banquet tendered by the manufacturers on October 13. The pamphlet contains 24 pages and presents verbatim the addresses made on that interesting and memorable occasion.

ENTERPRISE BRUSH COMPANY, 46 West Broadway, New York, have moved their factory plant from Glen Gardner, N. J., to 536-540 West Fourteenth street, New York. This company are manufacturers of a complete line of Brushes for household use, as well as a general line of Brushes, including those for painters. They will still maintain a sample room at 46 West Broadway near Park place, for the accommodation of the trade.

THE FAIRBANKS COMPANY, 311 Broadway, New York, have taken the entire building at 416-422 Broome street, corner of Elm, to which they will remove about February 1, 1902. As they now have, including warehouses and repair depots, four distinct establishments in New York, it is their purpose to combine them all under one roof in what they believe will prove to be a very desirable location in the near future. The completion of the underground rapid transit road, which passes the building (there being provision for a station at that point), the development of Elm street, which has already been cut through from the present bridge, and the approaching finish of the new East River Bridge, in their opinion justify them in a pioneer movement to the section indicated.

WM. G. HIBBARD, head of the house of Hibbard, Spencer, Bartlett & Co., Chicago, Ill., has provided for a handsome window in memory of Frank Bartlett to be placed above the main doorway of the A. C. Bartlett Gymnasium, for which the corner stone is to be laid at the University of Chicago on Thanksgiving Day. Mr. Bartlett is giving the new gymnasium to the university as a memorial to his son, a graduate of Harvard, who died in Germany last year. Mr. Hibbard, who is Mr. Bartlett's business partner, was much interested in the young man. Frederic Bartlett, a mural decorator of note, in respect to the memory of his brother, will do the decorating about the entrance in the main corridor and in the waiting rooms. The building will be completed and ready for use, it is expected, by October 1, 1902. It is of early Gothic architecture and will cost \$210,000, most of the sum having been given by Mr. Bartlett.

NOTES ON FOREIGN TRADE.

BRITISH LETTER.

Office of *The Iron Age*, HASTINGS HOUSE,
NORFOLK ST., STRAND, LONDON, W. C. NOV. 16, 1901. }

State of the Hardware Trade.

THE Hardware trade in the Midlands is only moderately active. Orders are coming in fairly well, but manufacturers would like to see the home market more active. From the colonial markets a good bulk of orders comes in regularly, but European requirements show a conspicuous falling off, doubtless due to the severe trade depression in Germany and Russia. The operation of the new tariff in Australia and the provisional tariff which has just come into force in China is likely to affect British markets. Some good indents have recently been received from the South American States, and especially Chili and Argentina; all kinds of electrical apparatus are in great demand. In the district of Wolverhampton the manufacturers of enameled plates for advertising purposes are working night and day, their orders being heavier than probably ever before. Wire woven articles for domestic and other purposes are selling well, but Agricultural Implements and garden requisites, either for home or export trade, are only in moderate request. Galvanized goods are selling freely and there is also a steady sale for Roofing Sheets, but this is almost entirely for export. The brass foundry business is fairly active, the makers of Taps, Unions, Hydrants and Lavatory Fittings reporting a good demand. Whatever is selling in builders' ironmongery is almost entirely for export. Employment in the Gun trade is at the present time good. In Sheffield the prospects all round are far from encouraging. The output of Crucible Steel is only about one-half of what it was up to the same period last year. The Crucible Steel houses mostly affected are those whose main trade is with the Continent, and particularly with Germany. The influence of the war is felt in the demand for fancy goods, Plated Wares and good Cutlery. At this time of the year trade is generally brisk in these lines, due to the nearness of Christmas, but now trade is slack and very little is doing. Sheffield travelers are sending home to their houses very discouraging reports, not only because of poor business, but of the great difficulty in collecting accounts. I have no doubt the heavy war loans have much to do with this. Bank managers have received instructions as far as possible to reduce overdrafts, with the result that while money is nominally cheap, it is really very dear to the small retailer. As indicating the state of trade so far as builders' ironmongery is concerned, the National Federation of Building Trade Employers has given notice to its employees to reduce wages. The decline in the building trade, which has been slowly creeping upon us during the past six months and to which I have made repeated reference in these columns, is now admitted on all hands. The reasons ascribed are, first, the war, and secondly, the continued high price of materials and labor.

Returning to the States.

John W. Hemenway of the Smith & Hemenway Company, 296 Broadway, New York, returns by the boat which carries this dispatch. He has done an extensive tour through Europe. He first went to Stockholm to settle various business matters connected with his agency of the L. M. Ericsson Electrical Company of that city. From Stockholm Mr. Hemenway went to St. Petersburg, and returned by way of Germany, Holland, Belgium, Paris and London. Mr. Hemenway found trade in a very depressed condition in practically all these countries. Although he has been unusually successful in England, yet he sees a period of depression coming and is preparing accordingly. He has no question in his own mind that American Hardware has come to this country to stay. From inquiries and observation made on the spot he indorses the opinion so often expressed by me that many of the difficulties can be solved by the appointment of a good agent.

Australian Prospects.

The Federal Commissioner of Customs for Australia has just issued a paper giving the estimated revenue to value of estimated imports on the provisional tariff, to which I have already referred. The main figures are worth reproducing:

Hheads of revenue.	Estimated value.	Estimated revenue.	Rate per cent.
Narcotics and stimulants...	\$9,548,660	\$14,876,870	155.81
Fixed and composite rates...	32,651,290	10,102,355	30.94
Ad valorem rates, 10 per ct.	5,200,000	520,000	10.00
Ad valorem rates, 15 per ct.	16,533,700	2,480,055	15.00
Ad valorem rates, 20 per ct.	29,705,000	5,941,000	20.00
Ad valorem rates, 25 per ct.	11,484,995	2,870,000	25.00
Total ad valorem.....	\$62,923,695	\$11,811,055	18.77
Grand totals.....	\$105,123,645	\$36,790,275	34.99

Coming to closer detail, I observe that division 6 covers metals and machinery. The changes in the tariff in these goods are as follows: Arms, raised from 1 to 15 per cent.; Plain Galvanized Iron, 15 shillings per ton; Corrugated, 30 shillings per ton, hitherto free. Lamps and Lamp Ware reduced from 25 to 30 to 20 per cent. Lead and manufactures of metals, with one or two unimportant differences, remain at 15 per cent. Horseshoe Nails, 7 shillings, instead of 7 shillings 6 pence; others, 3 shillings, instead of 7 shillings 6 pence. Axles, 25 per cent; Plated Ware and Plated Cutlery the same. Rails, 15 per cent.; hitherto free. Rolled Iron, Beams, &c., 20 per cent., instead of £3 per ton. Iron and Steel Scrap, 10 per cent.; previously free. Same applies to Pig Iron, Ingots, Slabs, &c. Bar, Rod and Angle Iron and others, 10 per cent.; in the past mostly free.

Back from Australia.

William Atkins of the firm of William Atkins & Co., Reliance Steel Works, Sheffield, has just returned from Australia, where his firm have large stores managed by his two sons. William Atkins says that at present Australia is greatly overstocked with Hardware. He says further that trade in the colonies is adversely affected by the system of British manufacturers consigning goods to agents or brokers, who work solely on commission. These men have no showrooms or premises of any kind, they rarely possess any capital and they are not directly concerned for the welfare of their employers. Commissions are all they seek, and consequently many of the goods so consigned are eventually sold by auction much below cost, to the detriment of legitimate trading. He says further that American and German makers of Files, Edged Tools, Saws and other Hardware goods have been unusually active in Australia, and by means of underselling they have secured a considerable share of business. William Atkins is of opinion, however, that the average colonist prefers British made goods, so long as price and quality are fairly equal. His final conclusion is that the enthusiasm for federation has cooled down considerably, while all agree that a period of trouble and anxiety will have to be passed before the great commonwealth scheme can be got into working order.

Forthcoming Exhibitions.

There are three exhibitions scheduled for next year which are worth the attention of American exporters. There is a Cork Industrial Exhibition, which will open up the South of Ireland to all likely sellers. Although we hear a good deal about the impoverishment of Ireland, it should be remembered that the real poverty occurs in the congested areas and upon those farms in the west and southwest which have been subdivided down below a real sustenance point. In the district of Cork and throughout the whole province of Leinster fairly large farms are tilled, much good dairy work is done and the people are prosperous. There is a demand in this district for all sorts of agricultural goods. It may also be remembered that the people would, if anything, prefer to buy from America than from England.

Another exhibition is to take place at Wolverhampton. Already the Midland Hardware and metal men are laying themselves out for a good time, and, as this is the very Hardware center of Great Britain, Americans who have Hardware specialties to exhibit should not

fail to be there. Personally I have a greater belief in these local exhibitions than in the much large expositions which have been so popular of late. The Glasgow Exhibition, although not on such large lines as Buffalo, has proved to be a gigantic success, financially and otherwise.

Then, in addition to these two exhibitions, particulars are now out for the American exhibition at the Crystal Palace. This bids fair to be a big success. On the American Advisory Committee are such well-known names as F. C. Van Duzer, honorary secretary of the American Society; R. Newton Crane, J. Walter Earle, Col. Millard Hunsiker, Col. Earle Church, Charles Churchill, Robert A. Fairbanks, J. W. Downer, Thomas J. Farrell, Clark Harrison, John L. Sardy, J. G. White and Irving G. Will. I will refer in greater detail to this exhibition a little later on.

Standardization of Screw Threads.

New York houses will be interested to hear of the result of the deliberations of the committee appointed by the Cycle Engineers' Institute, recommending the standardization of screw threads for cycle construction. Although the report is not yet published, I understand that the committee's recommendations are embodied in two tables, the first of which contains the following information: Diameter of screw, 0.050 to 0.084 inch, threads per inch, 62; 0.085 to 0.099 inch, threads, 56; 0.100 to 0.124 inch, threads, 44; 0.125 to 0.154 inch, threads, 40; 0.155 to 0.199 inch, threads, 32; 0.200 to 1 inch, threads, 26; above 1 inch, threads, 24. The second table elaborates this information, giving in most cases the part of the machine for which the particular sized screw is intended. The council has adopted these recommendations mainly because of the general practice as shown in the returns of the makers and the desirability of reducing the number of pitches to a minimum, and avoiding the use of more than one pitch for parts of the same diameter.

Hardware Organizations.

Ohio Hardware Association.

A meeting of the Executive Committee of the Ohio Hardware Association was held in Columbus on the 19th inst. The meeting was largely attended. H. C. Wiseman, ex-president of the association, was present by invitation and participated in the consideration of arrangements for the coming annual convention, giving valuable information in view of his wide experience in this work. A committee of Hardware merchants of Columbus, where the convention will be held, also met with them, and very kindly offered their services in any way.

The matter of insurance among the members was taken up and a committee of conservative men appointed to investigate it, and if satisfactory, the secretary was instructed to solicit and see how many members could be interested and how much money could be raised between now and February.

We are advised that all the members are very enthusiastic and determined to make the coming convention one of the best in the history of the association.

A booklet has recently been issued containing revised list of members and the constitution and by-laws.

Monongahela Valley Retail Hardware Dealers' Association.

Under date of the 8th inst. the following circular was mailed to all retail Hardware merchants in Western Pennsylvania by J. F. Frye, Charleroi, secretary of the Monongahela Valley Retail Hardware Dealers' Association:

That a closer social and business relation should exist among the Retail Hardware dealers of this State cannot be denied. In order to promote this greater fellow feeling, it is desired by many that a conference be called to which all legitimate retail dealers are cordially invited.

The place suggested is Pittsburgh, and the time, first week in December. Some of the officials of the National Retail Hardware Dealers' Association will be present

at this meeting, and it is expected that much good to the trade will result therefrom.

Please state, on the inclosed postal, whether or not you can be present, and, after a sufficient number of replies have been received, you will be notified of the date of the conference.

The response to this circular, we are advised, has been so generous and encouraging that it has been decided to hold the conference in question in Pittsburgh on Tuesday, December 10. The place of meeting will be designated in a later circular.

If any of our readers in that section have failed to get a copy of the above circular, Mr. Frye requests that they send him their names and addresses, as it is desired to interest all legitimate retailers of Hardware.

As indicated in the circular, several of the officials of the National Retail Hardware Dealers' Association will be present at the meeting, which, it is expected, will develop much that will be of benefit to the trade in Western Pennsylvania.

Washington Hardware Association.

The annual meeting of the Western Washington Hardware Association was held at Tacoma, Wash., on November 13. The most important action brought up was the matter of changing the name of the association and the enlarging of its scope. Owing to the fact that there is no Hardware association in Eastern Washington and that Hardware dealers in the eastern part of the State have shown a desire to come into the association, it was decided to change the name of the organization to the Washington Hardware Association and to invite all Hardware dealers in the State to join it.

The question of affiliation with the National Retail Hardware Dealers' Association was brought up during the meeting, but it was decided that for the present year all the endeavors of the members should be directed to the building up of the State organization, and that formal application for membership in the National Association should be made at the next annual meeting.

The following officers were elected to serve during the ensuing year:

Henry Mohr, Tacoma (re-elected), president.

F. M. Scheble, Wenatchee, vice-president.

D. G. O'Brien, Seattle, secretary.

C. W. J. Reckers, Seattle (re-elected), treasurer.

It was decided to admit traveling men representing Hardware firms as honorary members of the association.

After the close of the session the members participated in a banquet given at the Hotel Tacoma. An orchestra was in attendance, and an interesting and enjoyable evening was spent.

The following members of the association were present: Henry Mohr, Tacoma; R. I. Morse, Whatcom; J. W. Campbell, Seattle; Charles Hood, Puyallup; C. D. Patch, Seattle; Mills & Cowles, Olympia; William Christensen, Ballard; J. F. Wellborn, Whatcom; Thomas Moran, Arlington; C. S. Enger, South Tacoma; F. M. Scheble, Wenatchee; A. Gehrl, Tacoma; George L. A. Forck, Tacoma; W. M. Olive, Mission; G. W. Shannon, Anacortes; A. M. Bryant, Buckley; Frank T. McNitt, Centralia; Mr. Osgood, Everett; D. G. O'Brien, Seattle; C. W. J. Reckers, Seattle.

REQUESTS FOR CATALOGUES, &c.

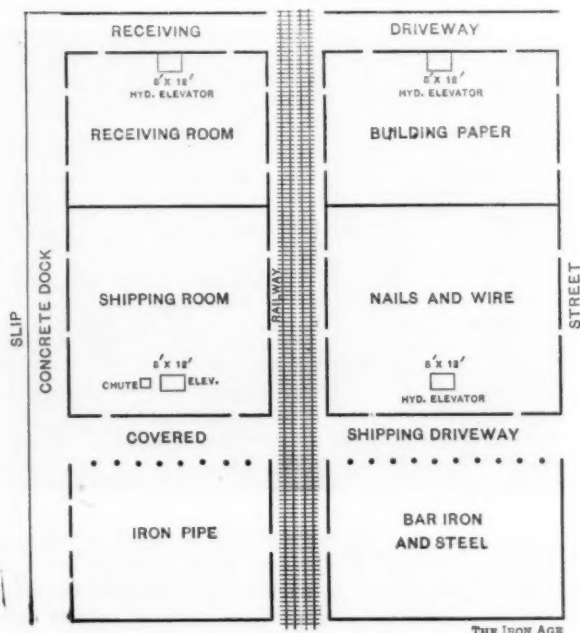
The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods

Hutchinson Lumber & Supply Company, Valdosta, Ga., wholesale Hardware, Lumber, Machinery, &c., advise us that they would be pleased to receive catalogues and price-lists relating to Hardware, Tinware and Mill Supplies.

Having bought the Hardware business heretofore known as Armstrong Bros. & Co., and expecting to run a regular wholesale and retail store, buying their goods in large quantities, Wolfe & Work, Augusta, Ky., request manufacturers to send them catalogues, quotations, &c., pertaining to the general Hardware line.

THE MARSHALL-WELLS HARDWARE COMPANY.

A MOST conspicuous stroke of enterprise in the wholesale Hardware trade in recent years is the completion of the great warehouses of the Marshall-Wells Hardware Company, at Duluth, Minn. The company had for some time found their business so rapidly outgrowing their facilities as to put them to much inconvenience, and about two years ago they decided to erect buildings specially adapted to their purposes which would give them ample room, would be located at a favorable point to secure both water and rail transportation facilities, and would have every known arrangement for saving labor and reducing expenses in handling goods. After long consideration a site was found on the lake front which met their requirements and they proceeded to build. The work of construction was finished last spring and the company moved in April 6. It is claimed that they now have the largest buildings ever erected expressly for the Hardware business. These buildings contain 35 large rooms, which are approximately 100 feet square, besides a considerable number of smaller rooms, having in all 9 acres of floor space. The ground plan shown



Ground Plan.

herewith illustrates the arrangement of the principal buildings and the relation of the admirable transportation facilities thereto.

The Company's Lines.

A few words seem necessary concerning the lines handled by this company, in order to convey a proper impression of the magnitude of their business and the necessity for so much room. These lines comprise Iron and Steel Cutlery, Guns, Sporting Goods, Fishing Tackle, Bicycles, Woodenware, Mining Supplies, Railroad Supplies, Contractors' Supplies, Lumbermen's Supplies, Saddlery Hardware, Stoves and Ranges, Paints and Oils, Carriages and Wagons, besides Heavy and Shelf Hardware in complete detail. They are also manufacturers of Harness and Strap Work and Horse and Mule Collars. As they receive great quantities of stock from Eastern manufacturers, it was extremely desirable to secure dock facilities for the receipt of such goods by lake vessels. The company constructed their own dock, which is a most substantial piece of work, having a concrete face and paved with brick. This dock is 300 feet long, 19 feet wide, and is available for the largest lake vessels, being one of the widest slips in the harbor of Duluth, and having a depth of 18 feet.

General Description of the Buildings.

Reference to the ground plan will enable the following description of the principal buildings to be easily comprehended: The main structure comprises two buildings, although they are so connected with each other as to form one structure for all purposes. These two buildings are each seven stories high, the one in front having a length of 200 feet and a depth of 120 feet, while the rear building nearest the dock is of the same length, but is 100 feet in depth. They are separated 28 feet to permit a double track railroad to run between them. This railroad gives facilities for loading or unloading eight cars at one time, and directly connects with all railroad lines running out of Duluth. Two driveways run through these buildings from front to rear. The buildings are connected twice in their length by six-story covered bridges, which connect all floors except the two lowest. Automatic self-closing fire doors are arranged at both ends of each bridge to prevent fire from spreading from one building to the other. The windows facing the court are all constructed with metal frames and sashes, fitted with wire glass, for the same purpose.

Two smaller buildings are located directly east of the main structure, from which they are separated by a covered driveway. The building near the dock is 100 x

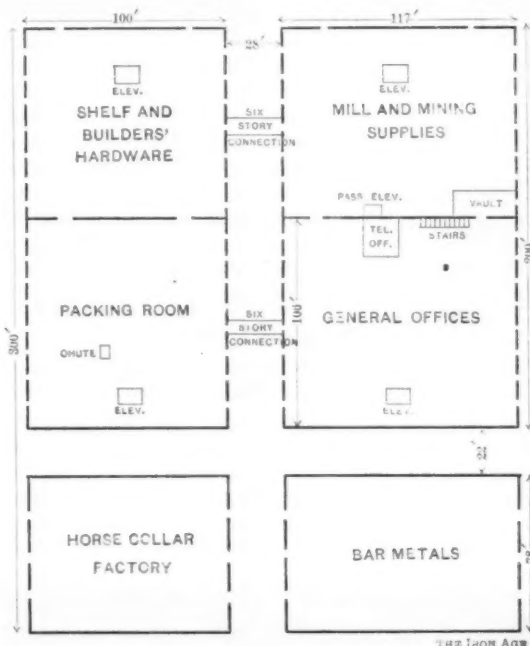


Diagram of Second Floor.

100 feet, two stories high, the lower story being used as a warehouse for Wrought Pipe and the second floor as a factory for the production of Horse Collars. The other building, located beyond the railroad tracks, is a one-story structure, 100 x 120 feet, which is used as a warehouse for Iron and Steel.

In planning these buildings great care was taken to secure not only convenience in handling goods in and out, but also to provide the most substantial construction, in view of the great weight of the merchandise carried, and further to arrange for every security against fire, both to avoid interference with business from such a cause, and also to procure low rates of fire insurance. The buildings are constructed of Lake Superior brown stone as a substructure, with heavy brick walls above. Thick fire walls divide the buildings across the center. These fire walls are pierced with a large opening in the center of each floor, which is provided with automatic self closing doors. An automatic sprinkling system is used throughout.

All floors are constructed with heavy girders and joists, which have been calculated to sustain any load that can be piled on them. The height of the first floor is 14 feet, of the second 12 feet, and of all the others 10 feet. This gives ample space for all shelving and bins.

This group of buildings does not cover all the buildings erected by the company for their special use. Another set of buildings is located about a block distant. These consist of two substantial brick buildings, one of which is principally used for stabling the company's horses and the other is an Oil warehouse. The stable building is three stories high, the top floor being used for the storage of rye straw required for the manufac-



The General Offices.

ture of Collars. The stock of straw is kept here, only a day's supply being taken to the Collar factory at one time, to diminish the danger of fire on those premises. The oil building is two stories high and is used for carrying a large stock of Oils, Varnish and other inflammable goods. These buildings are lighted with electric lights, the current being furnished from the company's power plant in their main building.

Our Illustrations.

Herewith we illustrate some of the special features of the establishment. First of all we give a ground plan of the main structure, and the Pipe and Iron warehouses. We also present a diagram of the second floor. Next we give a view of the handsome and commodious offices, which occupy about one-fourth of the second floor and furnish accommodations for nearly 100 persons. The private office of President A. M. Marshall



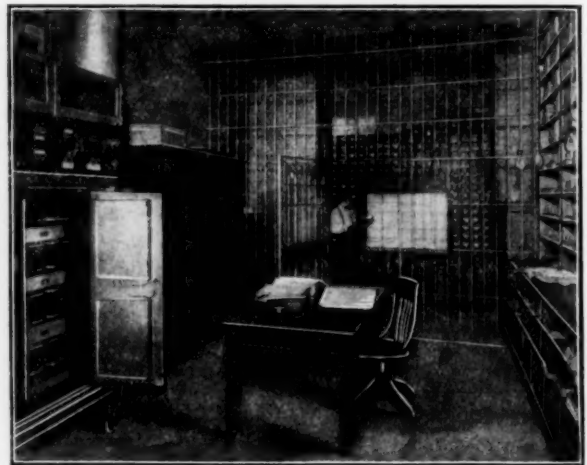
President's Private Office.

is next shown. Following is a view of one of the vaults, that shown being located on the second floor in connection with the main offices, and being used to store valuable records and account books in daily use. This vault is 14 x 34 feet in size, strictly fire proof and burglar proof. Vaults of similar size and construction are located on the first and third floors, the one on the first floor being used for storage of office records not in im-

mediate use and that on the third floor for storage of valuable Cutlery.

One of the aisles in the stock rooms is represented in the following illustration. This aisle extends over the bridge across the entire building, a distance of 248 feet. Nearly all the stock rooms are divided into similar aisles, containing shelving and bins, and are intersected by passageways leading to and from the elevators, as shown in the next illustration. A view of the company's Pipe warehouse is next presented. This warehouse is a separate building, but is connected to the main building by the shipping driveway, which is covered. The sides of the warehouse facing this driveway are open. Above the second story they are inclosed, and the entrance to same is from the first floor and not from the main building.

Next comes the Iron and Steel warehouse, which has the same loading and unloading facilities as the Pipe house. The following illustration gives a view of the Tin and Sheet Metal shop, 32 x 60 feet in size, which turns out a large amount of goods of their own design for special purposes, such as for lumbermen's and contractors' use. A part of the Harness factory is next shown. This factory occupies a space of 100 x 120 feet on the top floor of the building, facing the lake. The closing illustration is of a portion of shipping room, showing chute and hydraulic elevator. Goods on second



One of the Vaults.

floor and above, requiring packing, are received through the chute from the packing room and all others are brought down the hydraulic elevators, of which there are three, each having a carrying capacity of 6000 pounds and a speed of 200 feet per minute.

The Main Structure.

The basement is used for the storage of heavy merchandise, such as Boat Spikes, Wire Rope and large diameters of Pipe. Here also are located the boiler and engine rooms, which furnish power for all purposes required throughout the plant. The boiler room contains two large boilers and the power room is equipped with two direct connected engines for generating electric power and light, fire pumps of large capacity and two large steam pumps which operate the hydraulic power for the freight elevators. The machinery is all built in duplicate, so that in case of a break down on the part of an engine or pump another can be immediately brought into service and the disabling of the power facilities is thus avoided.

The first floor in the rear building near the dock is used as a storage room for Sheet Steel and as a shipping room. The floor of this room is on a level with the floor of a car. This shipping room receives all goods from any part of the building which are intended to be distributed to customers. The corresponding floor in the front building is used for the storage of Steel Roofing, Nails and Wire and Building Paper.

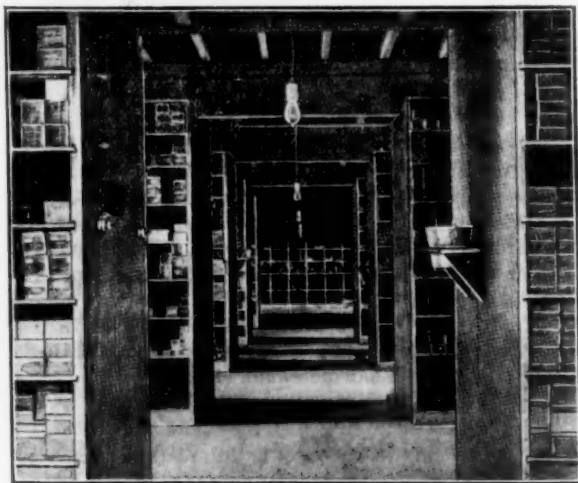
The second floor is perhaps the most important floor

in the entire structure. Here are located the general offices, which occupy one-quarter of the entire space on this floor. The offices are located in the front building and are approached by a broad stairway from the street, through an imposing entrance. At the top of this stairway is found an office of the Western Union Telegraph Company. The office has been located here for the con-



One of the Aisles in Stock Rooms.

venience of the Marshall-Wells Hardware Company in transacting their business. The size of the room devoted to office purposes is 106 x 117 feet. The arrangement is such that the desks near the entrance are occupied by clerks who attend to city business, others who open and distribute the mail and those who attend to general business matters connected with the routine work of the office. Near the door is located an inclosure for the cashier similar to a bank, having a window for customers on one side and a window for handling office matters on the other. Back of the cashier's inclosure are located the general bookkeepers, the auditing department, credit department, and the general financial department. Next comes the directors' room, beyond which is the president's private office. Adjoining is a special room for the use of the buyers as required. Along one side of the



Passageway in One of the Stock Rooms.

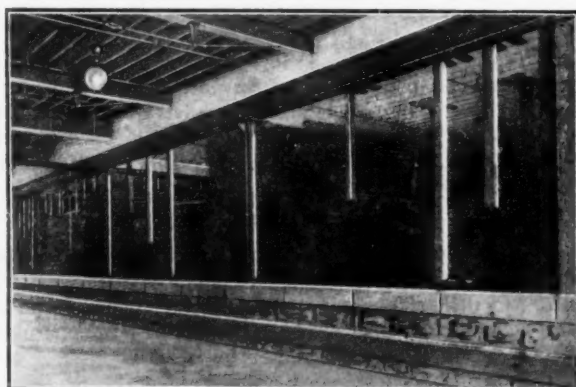
main rooms are the desks of the buyers, who number 12 in all. A portion of this room has been set off as a printing and stationery department, the stationery being printed on the premises.

Connected with the main office is an unusually large vault for the storage of valuable papers, files, &c. The number of persons in the main office room aggregate nearly 100, all of whom have an abundance of space and enjoy plenty of light. This room is very attractive in its appointments. The columns in this room which support the upper floors are steel instead of wood, as in other

parts of the building, the ceiling is paneled and finished in ornamental designs in sheet steel, heat is supplied by radiators from the power plant, and care has been taken to secure good ventilation. It is undoubtedly one of the finest general offices to be found anywhere in connection with a manufacturing or commercial house.

The remainder of the second floor in the front building is used for carrying a stock of Mill Supplies, Tools, and Fittings. The corresponding floor in the rear building is divided into two rooms, 100 feet square, one of which is used for carrying Builders' Hardware and Tools and the other is used as a packing room in which goods are assembled and prepared for shipping.

The third floor in the front building is devoted to Saddlery Hardware, Sporting Goods and Cutlery. The space used for Saddlery Hardware is 100 x 120 feet. The stock also includes all kinds of Horse Clothing. A sample room for Harness, containing glass front show-cases, is a feature of this department. Sporting Goods and Cutlery take the other half of this floor, 100 x 120 feet. The company carry an unusually heavy stock of Guns, Fishing Tackle and other Sporting Goods, with all the necessary accompaniments, such as complete outfits for hunters. The Guns are displayed in racks. The Cutlery stock is very extensive. A large fire proof vault



Pipe Warehouse.

is connected with the Cutlery department for carrying stocks of the most expensive grades.

The entire third floor in the rear building is devoted to Tinware.

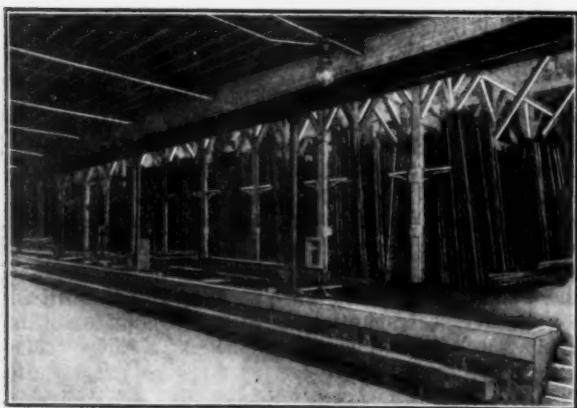
The fourth floor in the front building contains a large sample room for the display of a full line of samples of the Stoves and Ranges carried by the company. These samples comprise all classes of Stoves, including Steel and Cast Ranges, Cook Stoves, Hard Coal Base Burners, Oak Stoves, &c. This sample room would do credit to an exclusive Stove house. An extension of this sample room is used for the display of Carriages, showing a large line of various types of such Vehicles. This floor further contains a large room used for carrying a stock of Bicycles, a room fitted with shelving for Bicycle Sundries, and another large room for the storage of all kinds of Stove Hardware, Gas Stoves, &c. The fourth floor of the rear building is devoted to stocks of Shovels, Spades, Scoops, Axes and Cased Goods.

The fifth floor in the front building is partly used for the storage of Stoves and Ranges and partly for Wagons and Carriages. All these goods are crated and ready for shipment. The corresponding floor in the rear building is used for Tubs, Pails, Pumps, Well Buckets, Churns and other Wooden Ware, Baskets, Barn Door Hangers and Track, &c.

The sixth floor in the front building contains a stock of Wood Pulleys, Belts, Rubber Goods, Saws and other mill supplies, as well as Paints. The corresponding floor in the rear building is used for miscellaneous variety of merchandise.

The top floor in the front building is entirely devoted to Harness. One-half of this floor, 100 x 120 feet, is used as a Harness factory. This factory is equipped with a great deal of machinery operated by electric power, and here all kinds of Heavy, Light and Fancy Harness are

made. This factory is well lighted by skylights in the roof, as well as windows on the side, and is an admirable workshop. The manufactured harness is stored in the adjoining room, which is of the same size. All the Harness stored here is kept in closets to prevent injury from exposure to dust and air. The corresponding floor in the rear building is partly used as a tin shop. This shop, like the Harness factory, is well lighted from skylights and side windows, and contains a full

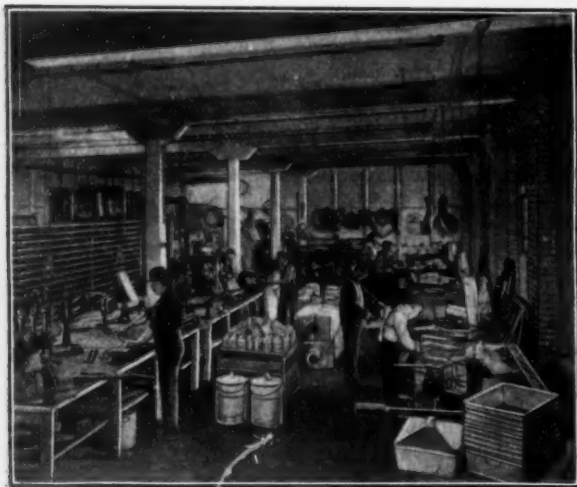


Iron and Steel Warehouse.

equipment of Tools used by tin and sheet metal workers. It is 32 x 60 feet in size and turns out a great deal of work. The remainder of this floor is used for the storage of such wooden ware as Screen Doors, Ladders, Wheelbarrows, &c.

Bridges.

The bridges, to which allusion has heretofore been made, enable such easy communication between the floors in the same story as to practically make them all one floor. The means of conveying goods from one place to another are of a character to greatly secure convenience and reduce cost. The goods are loaded on four-wheel trucks with broad tires, with which one man can easily move a load of 1500 to 2000 pounds. These trucks can be pulled into the aisles between shelving or bins, taken up and down the runways in the center of the floors, which are floored with hard maple, taken on the large freight elevators, which have 8 x 12 feet



Tin and Sheet Metal Shop.

platforms, or run directly into freight cars for shipping goods.

Freight Elevators.

The arrangement of the freight elevators is worthy of notice. These elevators consist of three large sized elevators running from the basement to the top floor and a hydraulic lift from the basement to the first floor. The large elevators are arranged as shown in the ground

plan. This arrangement secures ready access from all portions of the two buildings. The elevator in the west end of the rear building is located with a wide space between it and the wall to enable goods when received to be laid out on the floor for distribution to the several departments. This avoids blocking up the main runway, which would interfere with the handling of goods to fill orders. In addition to the freight elevators a passenger elevator is also a portion of the equipment of the plant.

Wrought Pipe Warehouse.

The Wrought Pipe house was carefully arranged to economize labor in handling Pipe from lake vessels into racks. The dock is raised several feet above the level in front of the other buildings, which brings it up to the proper height for receiving Pipe from the vessel and is also on the same level as the floor of the building and the floor of the freight cars on the track in the rear. This Pipe house is arranged with a large number of racks in which the Pipe is laid horizontally. The second story of the Pipe building is used as a Collar factory. Here 42 different styles of Horse and Mule Collars are made. This factory is equipped with the most modern machinery for stuffing Collars with straw, shaping, stitching, &c.

Iron and Steel Warehouse.

The Iron and Steel warehouse, immediately across the railroad track from the Pipe house, is admirably ar-



Sewing Room in Harness Factory.

ranged for its purposes. This house is 100 x 120 feet and has a clear height of 35 feet, with a lantern in the roof having a double row of windows. The Iron and Steel Bars are racked in the usual way, standing on end. The floor of this house is on a level with the floor of a freight car, being elevated above the driveway alongside of it so that wagons can be loaded with no lifting. This warehouse is arranged to carry an exceedingly large stock of the usual merchant sizes.

History of the House.

The history of this house is interesting. Its very rapid growth and the commanding position it now occupies in the Hardware trade are largely due to the energy and ability of Albert M. Marshall, who gained his experience in the Hardware business with Morley Bros. of Saginaw, Mich., and in 1893 purchased a controlling interest in the house of the Chapin-Wells Hardware Company of Duluth. The name of the company was then changed to the Marshall-Wells Hardware Company. From the time Mr. Marshall became interested in this establishment the business took on new life and grew rapidly. Mr. Marshall is president of the company. The vice-president, A. H. Comstock, had been cashier of the Home National Bank, Saginaw, Mich., for many years and removed to Duluth in 1894, when he took an active interest in this company. H. C.

Marshall, the treasurer and chief buyer, had for a number of years been located in New York City as buyer for a large syndicate of Hardware dealers throughout the country. He became connected with this company in 1895, and at that time was sole buyer. The development of the business in eight years is shown by the fact that he now has 11 assistants in his department. F. W. Parsons, secretary and credit man, was connected with the Chapin-Wells Hardware Company, and has thus been connected with the Marshall-Wells Hardware Company from the beginning. All these officers give their close personal attention to the details of the business.

Great advantage is secured by the peculiar location selected for the base of operations of this company. They occupy a very important strategical position at the furthest northern and western port on the great lakes, which is at the same time the eastern terminus of all the great trunk and other railroad lines traversing the territory from the lakes to the Pacific Ocean. No other establishment at any other distributing point has the combination of lake and rail transportation in its own building so near to the great territory in question. This gives the company not only the immense advantage of cheap lake rates from the factories in the East, in addition to the all rail routes, but they further have several hundred miles of advantage in nearness to that territory. The almost perfect facilities they enjoy in their new building for the economical handling of their busi-

ness and printing being done in Minneapolis. Many views of parts of the company's mammoth establishment are given, together with a view of Duluth Harbor, map of the large territory covered by the operations of the company, &c. It is prefaced by the following remarks:

The great West and Northwest, an empire in extent, in population and in resources, is enjoying, in common with the entire country, an unparalleled period of prosperity.

Hand in hand with the progress and development of this great region has been the growth and expansion of our business, until to-day we occupy a position second to none in the wholesale trade of this great and growing section.

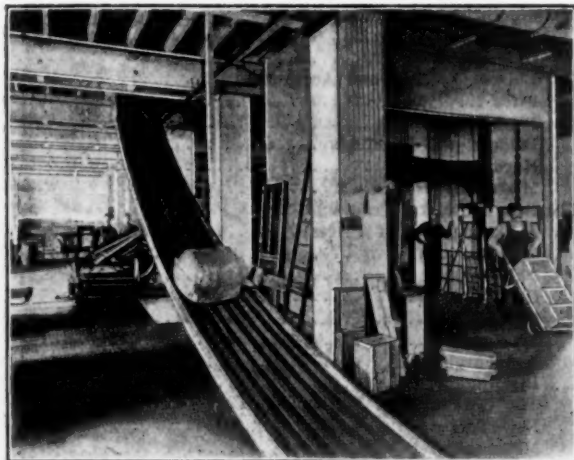
This growth has rendered necessary larger quarters and increased facilities. We have, therefore, built a new home, commensurate with our present requirements and growing needs, and we can say, without fear of successful contradiction, that it is the most commodious, well arranged, perfectly equipped and advantageously located wholesale house in the United States.

The trade in the Canadian Northwest is supplied direct from our branch house at Winnipeg, Man. We also have at Portland, Ore., a warehouse for the distribution of goods to the trade on the Pacific Coast.

These warehouses put us in close touch with the most distant parts of our territory, and enable us to meet the requirements of the trade in those sections with reasonable promptness.

We would be very glad to have you and all our other friends and customers visit us and see what a complete establishment we have, but, owing to the great distances intervening, this is impossible in most cases, so we have invoked the aid of the camera to visit you, taking our entire establishment along.

This will give you an opportunity to look us over and see for yourself the manifold advantages we possess over every other section for serving you promptly, economically and satisfactorily.



Shipping Room, Showing Chute and Hydraulic Elevator.

ness enable them to reduce to a minimum the item of drayage, which is an important element of expense in the wholesale business. Taking this in connection with their advantageous transportation facilities they are splendidly equipped to compete with anybody in the territory which they cover.

The company are operating a branch house in Winnipeg, Canada, under the name of the Marshall-Wells Company. They occupy a fine four-story building specially erected for their purpose during the past year. They also have a distributing warehouse in Portland, Ore., for the convenience of their Pacific Coast trade.

The business of this house extends from the Eastern limits of Michigan through to the Pacific Coast, embracing all the States north of Illinois, Missouri, Kansas, New Mexico and Arizona. They employ 52 traveling salesmen and have 307 employees in their warehouse at Duluth. Some time since they completed a catalogue of 1600 pages, which they offer to the trade as a complete compendium of the Hardware business. This catalogue is claimed to present more departments than that of any other firm in the Hardware trade, everything shown being carried in stock.

A Souvenir.

As a souvenir the company have issued a very attractively printed pamphlet, entitled "Where Rails and Water Meet." This highly creditable and artistic souvenir was designed, illustrated and the text prepared by the advertising department of the company, the engraving

PLYMOUTH, MASS., MANUFACTURING NOTES.

THE industries of Plymouth, Mass., the principal products of which are Tacks, Wire Nails, Rivets, Burrs, Cordage and Woolens, are particularly prosperous at this time; in some lines enough orders are already in to keep them busy for months to come, and in several instances additions have been made that will materially increase capacities.

The Plymouth Mills, manufacturing Rivets, Tacks, Staples, Small Washers, Burrs and Escutcheon Pins, have erected an addition, 70 x 100 feet, one story high, with a monitor roof. The building is of wood, substantially constructed and well lighted, and will be used exclusively for the manufacture of Rivets, the machinery being operated by electric power. This firm have recently purchased the property of the Robinson Iron Company, situated about ½ mile down the stream, and will demolish all the buildings of the old Nail mill plant, which have not been in use for a number of years and are badly decayed. Over the water wheel of this plant will be built a brick power house with a 125 horse-power motor; this power will be sent back to the Plymouth mills and used to operate several of their departments, the others being run by a 125 horse-power water wheel at the plant.

Ripley & Bartlett, established in 1879, manufacturers of a large line of Tacks and Small Nails, are very busy, as they have been for some time.

The Plymouth Cordage Company are building a new tar house, 100 x 300 feet, of brick, one story high, with basement under a part. They are doing a large business in Rope for power transmission.

Cobb & Drew, manufacturers of Rivets, Staples, Burrs, Washers, Tacks, &c., who also operate a factory at Rockfalls, Ill., are busy, with orders ahead.

Edes Mfg. Company, manufacturers of Battery Zincs, &c., report a satisfactory number of orders for this season of the year.

BOSTON & LOCKPORT BLOCK COMPANY.

ON or about December 1 the Boston and Lockport Block Company, Boston, expect to remove their stock rooms and offices from their present quarters to 158 and 160 Commercial street, which are now being fitted up to accommodate their increasing business. The entire building of five floors and basement will be utilized as follows: First floor, offices; second, sample rooms for Pumps, Trucks and Differential Hoists; third, stock room for Wood, Iron and Steel Blocks; fourth, stock room for Trucks. They will install a branch exchange telephone with two receiving lines instead of one, as at present. The company will transfer as far as possible their shipping department from the East Boston factory to the Commercial Street store, thus saving about a day's delay in shipment. They are planning to carry much larger stocks than before, especially of Wire Rope Blocks and such goods as are called for frequently by railroads and contractors for emergencies. The company are now at work on their 1902 catalogue, which, when completed, it is stated, will be the largest and most complete Block catalogue ever published. They will be pleased to enter applications for it when finished, which will be in about two months.

M'KENNA BROS. BRASS COMPANY.

MCKENNA BROTHERS BRASS COMPANY, LIMITED, Pittsburgh, Pa., manufacturers of Brass Goods and Saloon Supplies, have about finished a new six-story building at First avenue and Ross street, Pittsburgh, which the concern expect to occupy about December 1. The structure is of steel and buff brick and has a frontage of 84 feet on First avenue and 100 feet on Ross street, the cost being about \$110,000. The firm will occupy the entire building, with the exception of the three upper floors, which will be leased for power space. Modern electric motors, gas and steam engines will be installed. The company have occupied quarters on Third avenue, Pittsburgh, for many years, but their business has entirely outgrown their present facilities and the erection of the new building was an absolute necessity. The concern will have better and larger facilities for taking care of their trade in their new building, and will have one of the finest plants of its kind in the country.

SARGENT & CO.'S FOOD CHOPPER BOOKLET.

SARGENT & CO., New Haven, Conn., and 149-153 Leonard street, New York, in a 16-page 13½ x 8½ inch folder in legal document form, just issued, describe the "What, Why and How" of Sargent's Gem Food Chopper. The first portion illustrates and describes the Chopper in its various details. Then follows a series of 14 prepared advertisements of various kinds and sizes adapted for use in the local newspaper or other medium. Sargent & Co. are ready to furnish these cuts, with the dealer's name and address inserted in space at bottom of advertisement, free of charge on application.

SNELL MFG. COMPANY'S NEW CATALOGUE.

SNELL MFG. COMPANY, Fiskdale, Mass., John H. Graham & Co., 113 Chambers street, New York, selling agents, have just issued an illustrated and descriptive catalogue of their complete line of Carpenters' Tools, among which are Carpenters' Augers and Bits, Ship Augers and Bits, Boring Machines, Screw Drivers, Countersinks, Reamers, Nail Sets, Cold Chisels, Punches, Gimlets and Gimlet Bits of various kinds, Ice Picks and other similar goods. There are some revisions of list prices. This business was established in 1790.

The Barbour Hardware Company's store at East St. Louis, Ill., was robbed on the night of the 19th inst. of about \$150 worth of single and double barrel Guns, Revolvers, and Knives.

CONTENTS.

	PAGE
The Iroquois Iron Company's New Furnace. Illustrated....	1
Canadian News.....	2
Nathaniel Baxter, Jr., Heads a New Enterprise.....	3
Notes from Mexico.....	3
Production of Illuminating Gas from Coke Ovens. Illustrated.....	4
A Notable Advance in Shipyard Practice. Illustrated.....	14
An Electric Stock Gauge for Furnaces.....	16
Central Pennsylvania News.....	17
The Mining Engineers in Mexico.....	18
Shenango Valley Notes.....	21
No Duty on Dutch Metal Clippings.....	21
Trade Publications.....	22
Unprecedented Expenditures for Railroad Equipment.....	22
The Reciprocity Convention.....	23
Notes from Great Britain.....	24
The Turner, Vaughn & Taylor Wire Truck. Illustrated.....	25
Lake Mining Matters.....	26
A New Rolling Mill and Spike Factory.....	26
Editorials:	
Manufacture of Black Plate to Be Revolutionized.....	27
The Reciprocity Convention.....	27
Famine in Spot Tin.....	27
Street Rails for Interurban Trolley Lines.....	28
Memorial Church Erected by Judge Gary.....	29
New Publications.....	29, 43
Central American Notes.....	30
Obituary.....	31
The Charleston Interstate Exposition.....	32
Personal.....	32
World's Pig Iron Record Beaten.....	33
A Southern Sheet Plant.....	33
Manufacturing:	
Iron and Steel.....	33
General Machinery.....	34
Boilers, Engines and Accessories.....	34
Fires.....	34
Foundries.....	35
Bridges and Buildings.....	35
Hardware.....	35
Miscellaneous.....	35
The Iron and Metal Trades:	
A Comparison of Prices.....	36
Chicago.....	36
Philadelphia.....	38
Cleveland.....	38
Cincinnati.....	39
St. Louis.....	39
Pittsburgh.....	40
Birmingham.....	41
The German Iron Market.....	42
New York.....	43
Metal Market.....	43
Iron and Industrial Stocks.....	45
Cincinnati Machinery Market.....	45
The Philadelphia Machinery Market.....	46
The Cleveland Machinery Market.....	47
The New York Machinery Market.....	49
Calamitous Boiler Explosion.....	50
Hardware:	
Condition of Trade.....	51
Notes on Prices.....	52
Supplee Hardware Company's Buffalo Exhibit. Illus... ..	54
Correspondence:	
A Novelty in Checks.....	54
Trade Items.....	54
Notes on Foreign Trade.....	55
Hardware Organizations.....	56
Requests for Catalogues, &c.....	56
The Marshall-Wells Hardware Company. Illustrated... ..	57
Plymouth, Mass., Manufacturing Notes.....	61
Boston & Lockport Lock Company.....	62
McKenna Bros. Brass Company.....	62
Sargent & Co.'s Food Chopper Booklet.....	62
Snell Mfg. Company's New Catalogue.....	62
Price-Lists, Circulars, &c.....	63
Among the Hardware Trade.....	63
Miscellaneous Notes:	
Solidhead Brass Paper Fasteners.....	63
Trojan Steel Oil Finished Shingle Bands.....	63
Wood Top Racing Skate. Illustrated.....	63
Swedish Side Cutting and Splicing Pliers No. 125. Illustrated.....	63
Polished Steel Key Rings. Illustrated.....	64
Paragon Drawing Pen. Illustrated.....	64
The American Rotary Washer. Illustrated.....	64
The American Ventilating and Burglar Proof Lock. Illustrated.....	65
Mellink's Fire and Water Proof Vault. Illustrated.....	66
Home Savings Steel Safes. Illustrated.....	66
Eyelet Plier. Illustrated.....	66
Current Hardware Prices.....	67
Current Metal Prices.....	74

PRICE-LISTS, CIRCULARS, &c.

MAINE MFG. COMPANY, Nashua, N. H.: Folder, which they are ready to furnish to their customers in liberal quantities, printing in the name and address of the merchant. The folder is devoted to their White Mountain Refrigerators and attractively calls attention to the merits of this line.

W. B. MITCHELL, agent, successor to Chicago Skein & Axle Works, office at 80 Michigan avenue, Chicago: Catalogue of Wagon Skeins, Shoe Stands, Lasts, Cobblers' Sets, &c.

SHIPMAN, BRADT & Co., DeKalb, Ill.: Illustrated price-list of their Hardware Delivery Wagons. The manufacturers call attention to the low down, short turn, high wheel, straight bottom, short coupled, light draft features of their Wagons. They have lately added to their line a new style Wagon, No. 63, which is referred to as just the Wagon for Stoves, Furnaces or any heavy goods. It is easy to load, the body being only 22 inches from the ground. Extension for ladders and spouting is furnished if desired. The wagon is attractively finished and offered in four capacities, from 1000 to 2000 pounds.

MONARCH REFRIGERATOR WORKS, Burlington, Vt.: Illustrated catalogue and price-list for 1902 of the Monarch Dry Air Refrigerators, with removable and cleanable flues and removable ice chambers, zinc lined and nickeloid lined. Their line comprises Domestic, Slide-board, Water Cooler and Grocers' Refrigerators, Ice Chests, &c.

THE IXL & GOSHEN PUMP COMPANY, Goshen, Ind.: Catalogue K, of Screen Doors and Improved Center Extension Window Screen. It is accompanied by trade list and order blank. They are also manufacturers of Kitchen Cabinets, Cupboards, Sinks and Tables and Wood and Chain Pumps.

LOEB CARRIAGE COMPANY, Montgomery, Ala.: Catalogue No. 5, 281 pages, showing the full line of Carriage and Wagon Hardware, Blacksmiths' and Farriers' Tools, Machinery, &c., carried by them. It is accompanied by a 50-page price-list applying to the catalogue.

QUEEN ANNE SCREEN COMPANY, Burlington, Vt.: A catalogue has just been issued showing the company's line of Screen Doors and Window Screens for the season of 1902. In addition to styles which have heretofore been on the market they are now offering two new styles of fancy Screen Doors, F and G, which are made from kiln dried stock, natural finish, thoroughly varnished, fancy turned spindles, and both sides molded.

STURGES, CORNISH & BURN COMPANY, Chicago: Milk Can catalogue, which contains all their standard patterns

tributing among their customers a pamphlet of 26 pages, issued in commemoration of their silver anniversary. This gives a history of their business from 1876 to 1901. Illustrations show the first building occupied by the company, as well as those subsequently used by them, including the one erected in 1885, which they now occupy. The company's main store was destroyed by fire in 1880 and their annex in 1885. Notwithstanding these disasters the business has shown a continuous and gratifying growth.

MISCELLANEOUS NOTES.

Solidhed Brass Paper Fasteners.

The Hawkes-Jackson Company, 82 Duane street, New York, are manufacturing the Solidhed brass fasteners, which are made somewhat like thumb tacks, but with round, stiff, brass split pins. The advantage of this fastener is that it can be pushed through several thicknesses of paper or fabric and bent over, having more rigidity than the usual kind having thin wrought brass flat split points, the pins above described being more of the nature of wire. Three sizes are made, with a uniform size of head, but with split pins variously $\frac{3}{8}$, $\frac{1}{2}$ and $\frac{3}{4}$ inch in length. After forcing through the material, which in most instances can be done without the use of punch or awl, the points will lie closed and remain firm.

Trojan Steel Oil Finished Shingle Bands.

Walter A. Zeinicker, St. Louis, Mo., is offering his Trojan steel oil finished shingle bands, which are claimed to possess great tensile strength. The bands are $\frac{1}{2}$ inch wide and two gauges thinner than ordinary bands. It is pointed out that this means a saving in weight, as there are more of the Trojan bands to the pound, and while the price per pound is slightly higher, yet per band it is lower. The point is also made that the bands are oil finished to prevent rusting. The ends of the bands are punched by automatic machines to insure their being punched correctly. The bands are carried in stock in standard lengths, but can be made up in all lengths up to 20 inches. Samples and prices will be sent by the manufacturers upon application.

Wood Top Racing Skate.

Barney & Berry, Springfield, Mass., New York office 114 Chambers street, have just put on the market the wood top racer, style C, here illustrated. This skate is similar in character to styles A and B, previously on the market, except that it has a button fastening at the



Wood Top Racing Skate.

of Railroad and Cheese Factory Milk Cans, together with their dairy line.

AMONG THE HARDWARE TRADE.

Samuel Emmert, Hardware merchant, Hagerstown, Md., on February 1 will take possession of the store adjoining his establishment and connect the two rooms. With the addition he will have a floor space 41 x 130 feet. Mr. Emmert is now making a 40-foot addition to the warehouse in the rear of his store. The building is of galvanized iron, two stories high, and when enlarged, will be 41 x 110 feet in dimensions.

The warehouse of the Osceola Hardware & Furniture Company, Osceola, Neb., was damaged by fire a short time since. The loss was about \$1800, with insurance of \$1500. The company's store was not damaged by the fire, and business went on as usual.

John W. S. Pierson & Co., Stanton, Mich., are dis-

heel, instead of the long screw of the ordinary wood top racer. The wood is finished to resemble rosewood, the center and toe plates are set flush, and all metal parts are finely polished and nickel plated. The blades are $\frac{1}{8}$ inch thick, 14, 16 and 18 inches long, tempered, polished and nickeled. The straps are of russet grained leather of the best quality.

Swedish Side Cutting and Splicing Pliers No. 125.

Smith & Hemenway Company and the Utica Drop Forge & Tool Company, 296 Broadway, New York, are putting on the market the pliers shown herewith. They are referred to as first-class tools for electrical work, such as telephone, telegraph, or for any work where side cutting pliers are required. They are made from Swedish electro-boracic steel, which, it is explained, has been tested for years and found to stand cutting the hardest steel and iron wire without affecting the cutting edge.

The pliers have the company's patent round edge, which, it is pointed out, is an advantage, as the tool can be carried in the pocket without wearing or tearing the clothes; also that the round edge is desirable when workmen are liable to drop pliers on the wire where they are working, as square edges will invariably break the scale, thus injuring the conductivity of the wire. The pliers, it is stated, are absolutely necessary for copper wire work. The tool has polished head and jaws,

imports specially and carries in stock a wide range of staple key rings manufactured at the same works, made of steel and finely polished, in round, diamond shape, chased and other styles.

Paragon Drawing Pen.

Keuffel & Esser Company, 127 Fulton street, New York, have just added to their extensive lines of draw-



Swedish Side Cutting and Splicing Pliers No. 125.

and is furnished either half polished, polished or nicked, and is made in six sizes.

Polished Steel Key Rings.

A. Klein, 453-455 Broome street, New York, has recently put on the market a group of polished steel key rings which have some elements of novelty. These goods, for which A. Klein is the sole agent in the United States, are made in Austria, of high grade material and

ing materials the Paragon drawing pen, shown in the accompanying illustrations. The object of this device is to supply draftsmen with a drawing pen which can be instantly opened for cleansing and closed again without altering its original setting. The blades are widely separated by the spring in the upper blade, when the excenter on the angular shank of the adjusting screw is released. On reapplying it the blades are brought to



Fig. 1.—Hexagon Key Ring.



Fig. 2.—Loop Key Ring.

highly polished by a secret process. Fig. 1 is a split steel hexagon key ring. Fig. 2 is known as the loop style, the key being slipped on at the point designated by a ball on the left of the cut. Fig. 3 is heart shape, which, in common with Fig. 4, is used largely for advertising purposes, although it can be furnished perfectly plain if so desired. All the illustrations are actual size.



Fig. 3.—Heart Shape Key Ring.



Fig. 4.—Flat, Round Key Ring.

The heart and circular rings, illustrated in Figs. 3 and 4, are intended for advertising purposes, giving the dealer's name, address and a brief reference to goods, as shown in the cuts, and have enameled surfaces, either blue or brown, or can be nickel plated. The advertising rings are suitable for dealers who wish to have some such device at a slight cost to distribute to customers, and orders for these goods are taken for import and furnished within a reasonable time. Mr. Klein also both

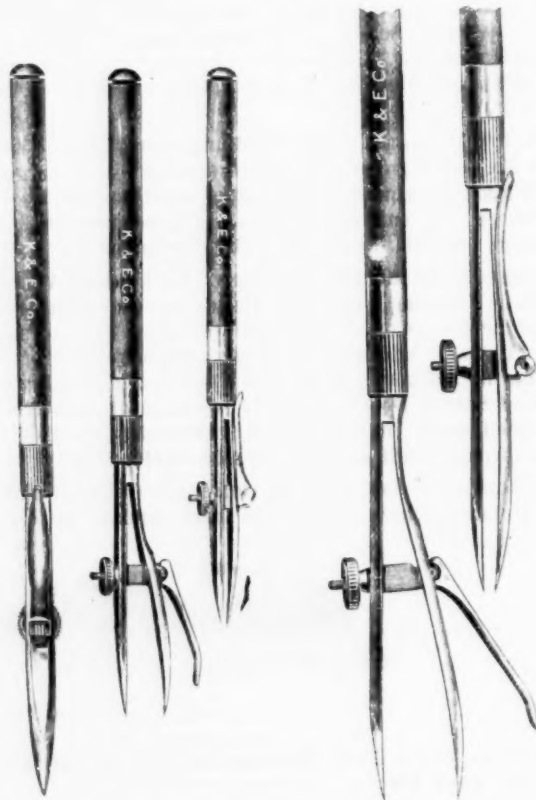


Fig. 1.—Paragon Drawing Pens, Two-thirds Size.

Fig. 2.—Pen Open and Closed.

exactly their original position, smoothly and without jar. The adjusting screw is on the lower blade, which permits of changing the adjustment by applying one finger of the hand holding the pen. The pens are regularly made with ebony handles in 4½, 5 and 5½ inch lengths, or they can be furnished with aluminum handles at a slight advance in price.

The American Rotary Washer.

The accompanying cut represents a washing machine offered by the Bluffton Mfg. Company, Bluffton, Ind. The motion is referred to as a departure from all other rotary motions. The gear is represented as the strongest

leverage known and the operation of the washer as the easiest. Strain of castings is not known in this gear, it is remarked, hence breakage is eliminated. The machine has a locking hinge gear, which locks it when open or closed. When opened the gear raises the lid, bringing it to a position far from interference with loading or unloading the machine, and giving ample room for use of the wringer. It is pointed out that the speed is fast



The American Rotary Washer.

and that the rotation of the pin wheel is with a large sweep, causing great agitation of the water, which is the factor that cleanses clothes. The manufacturers state that the machine is of the highest quality throughout and the finish on the best.

The American Ventilating and Burglar Proof Lock.

The ventilating and burglar proof lock, shown full size in Fig. 1 of the accompanying cuts, is offered by

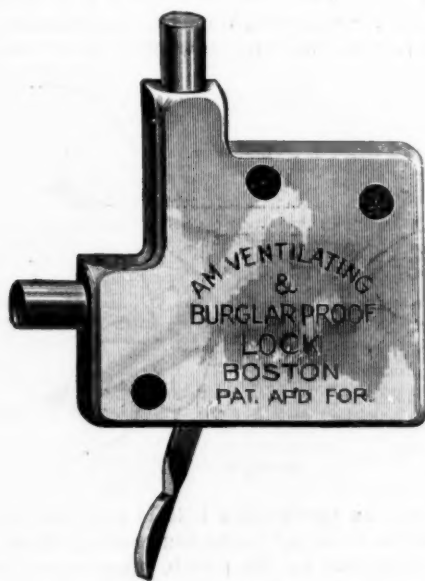


Fig. 1.—The American Ventilating and Burglar Proof Lock, Full Size.

Homer F. Livermore, 85-87 Pearl street, Boston, Mass. The lock is devoid of springs, but both bolts are thrown in or out at the same time by the movement of the

lever. As shown in Fig. 3, the lock is attached on the top of the lower sash, and when the bolts are thrown, one enters a hole bored in the window frame and the other enters a hole made in the upper sash. Holes may

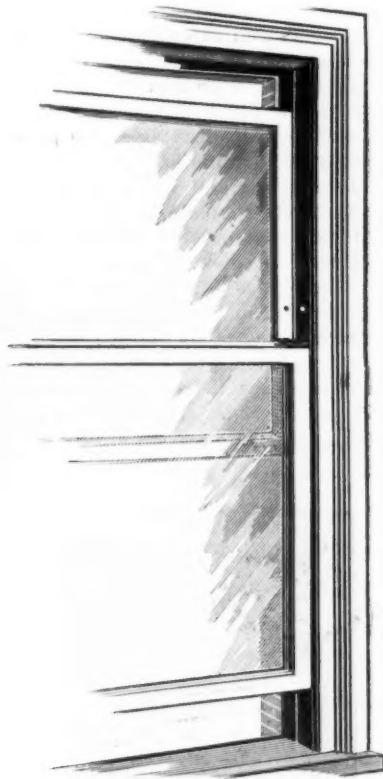


Fig. 2.—Ventilation with American Lock.

be bored at suitable points to permit the window to be locked open for ventilation, as in Fig. 2, or locked closed, as in Fig. 3. The lock is designed for protec-

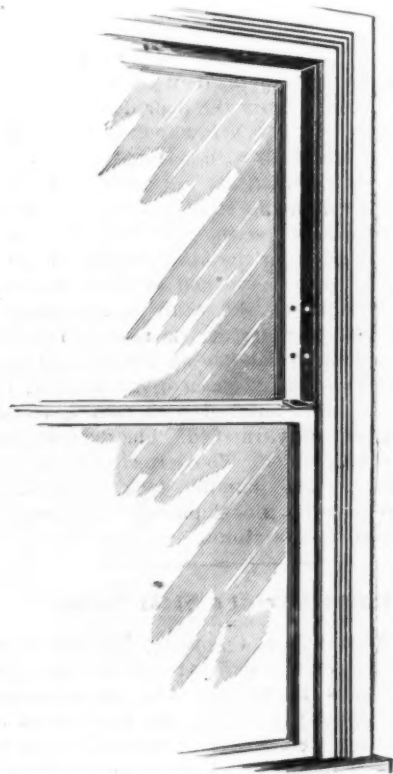


Fig. 3.—Window Closed and Locked.

tion, while allowing ventilation if desired. It is referred to as simple, strong, inexpensive and as easily put on. The locks are furnished in five finishes: Black or brown japan, brass, nicked plated and bronze.

Mellink's Fire and Water Proof Vault.

The vault shown in the accompanying illustration, designed as a safe deposit vault at home, is offered by the Mellink Mfg. Company, Toledo, Ohio. A rubber gasket is set on the inner flange of the door frame to make it absolutely water tight. It is remarked that more damage is done to papers and valuables in any fire by water than by fire itself. The outside of the vault is 13½ inches long, 9¼ inches wide and 8½ inches deep. The inside measurements are 10¼ inches long, 6½ inches wide and 5¼ inches deep, leaving a fire proof wall 1½ inches thick entirely surrounding the inside box, which, it is stated, is able to stand the most severe fire test without damage to its contents by fire or water. The entire vault inside and outside is described as being constructed of steel plate with extra heavy solid iron frame work. The door is hung on wrought steel hinges with internal fastenings. The door frame and the door are provided with three offset flanges which, it is explained, makes it fully as strong as any large safe. On the inner or lower flange the rubber gasket is secured. The space between the inner and outer walls is securely packed with proofing material, forming one solid wall



Mellink's Fire and Water Proof Vault.

when completed. The lock is made of a combination screw and four tumbler safe lock with 5000 changes. Duplicate keys are supplied with each vault. The screw is provided to draw the door down tightly against the rubber gasket. The screw which forms a part of the handle is provided with a large head underneath the top steel plate, which has a groove cut at each quarter section of its diameter to receive the bolt of the lock. Thus, it is shown, when the safe is locked the handle might be knocked off, or the hinges might be cut off, but the safe could not be opened without releasing the screw. The weight of the vault is approximately 75 pounds, and cannot therefore be readily handled, it is pointed out, although it takes up but a small place, and is convenient to set in a closet or on a shelf, ready of access. The vault is finished with four coats of black enamel, polished and varnished. The decorations are in gold with varnish finish. The lettering is in gold with colored shading. The handle, lock, door knob and hinges are all heavily nickel plated. The inside of the vault is finished in aluminum.

Home Savings Steel Safes.

Edmonds-Metzel Mfg. Company, 778-784 West Lake street, Chicago, Ill., are offering the savings safe here shown. It weighs 1½ pounds, and the manufacturers refer to its simplicity, strength and mechanical correctness. The coin device, Fig. 2, is referred to as positive and always to be depended upon. Tool steel balls, piano wire springs and hard steel make it, it is stated, indestructible. All the coin and locking mechanism is attached to the cover, as shown in the smaller cut in Fig. 2. The magazine or body of the safe is ¼ inch thick and clear of obstructions, so that the contents can be emptied to the best advantage. It is pointed out that

the safes may be distributed by bankers and trust companies to their patrons for home use. New customers of youthful age, it is shown, are thus brought to the



Fig. 1.—Home Savings Steel Safe.

bank, and if courteously treated are not likely to change their banking place as they grow to manhood and womanhood. It is stated that hundreds of banking

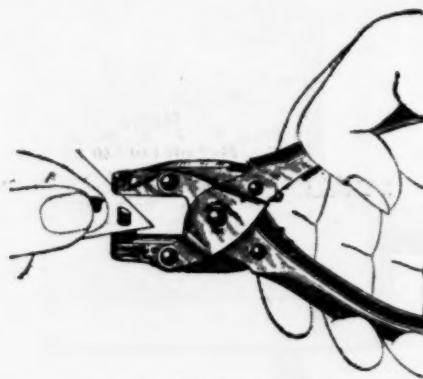


Fig. 2.—Parts of Safe.

firms have largely increased their list of depositors by using this modern plan of drawing and holding trade.

Eyelet Plier.

The Hawkes-Jackson Company, 82 Duane street, New York, have just put on the market another of their several specialties trade-marked "Solidheds." This device is in the form of a nickel plated eyelet plier, as here illustrated, which combines both punch and eyelet set. It is designed for eyeletting all sorts of documents, legal and other papers, fabrics, &c., that it is desirable to



Eyelet Plier.

hold together. In operation a hole is punched through the material, as indicated in the illustration, when, with the article still held by the punch, an eyelet with the small end down is slipped over the top of the punch, another compression of the handles flanging out the other end of the eyelet and clamping the various parts together. The eyelets, which the company also furnish, are referred to as made of a noncorrodible composition which will not soil or stain paper or fabric, and are neatly put up in round wood boxes.

Cartridges—

Blank Cartridges: 10¢ @ 10¢ 10¢
 38 C. F., \$5.50 10¢ @ 10¢ 10¢
 38 C. F., \$7.00 10¢ @ 10¢ 10¢
 32 cal. Rim., \$1.50 10¢ @ 10¢ 10¢
 32 cal. Rim., \$2.50 10¢ @ 10¢ 10¢
 B. B. Caps, Con. Ball Single, \$1.80 @ 1.85
 B. B. Caps, Round Ball, \$1.10 @ 1.15
 Central Fire 25¢ @ 25¢ 25¢
 Pistol and Rifle 15¢ @ 15¢ 15¢
 Primed Snells and Bullets 15¢ @ 15¢ 15¢

Rim Fire Sporting 50¢ @ 50¢ 50¢
 Rim Fire, Military 15¢ @ 15¢ 15¢

Castors—

Bed 70¢ @ 70¢ 10¢
 Plate 75¢ @ 75¢ 10¢
 Philadelphia 75¢ @ 75¢ 10¢
 Boss 70¢ @ 70¢ 10¢
 Boss Anti-Friction 70¢ @ 70¢ 10¢
 Martin's Patent (Phoenix) 45¢
 Payson's Anti-Friction 70¢ @ 10¢ 10¢
 Standard Ball Bearing 45¢
 Tucker's Patent, low list 30¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Coll—

American Coll. Cask lots:

3-16 1/4 5-16 3/4 7-16 1/2 9-16
 8-00 6-00 5-00 4-25 4-10 4-00 4-05
 3/4 3/4 to 1 in. 3/4 to 1 1/4 inch.
 3.55 3.85 3.75 per 100 lb.

Less than Cask lots add 25¢.

German Coll. list July 24, '97. 65¢ @ 10¢ 10¢

Halters and Ties—

Halter Chains 50¢ @ 10¢
 German Halter Chain, list July 24, '97 60¢ @ 10¢ 10¢
 Cow Ties 10¢

Trace, Wagon, &c.—

Traces, Western Standard: 100 pair
 6 1/2-6 3/4, Straight, with ring \$30.00
 6 1/2-6 3/4, Straight, with ring \$1.00
 6 1/2-8 1/2, Straight, with ring \$35.00
 6 1/2-10 1/2, Straight, with ring \$38.00
 Add 2¢ per pair for Hooks

Traces 24¢ per pair higher than
 Straight Link.

Trace, Wagon and Fancy Chains 50¢ @ 10¢ 10¢ 10¢

Miscellaneous—

Jack Chain, list July 10, '93:

Iron 60¢ @ 60¢ 10¢
 Brass 10¢ @ 60¢ 10¢
 Safety Chain 70¢ @ 70¢ 10¢
 Gal. Pump Chain 10¢ @ 4 3/4 5¢
 Covert Mfg. Co.:

Breast 35¢ @ 25¢
 Halter 35¢ @ 25¢
 Heel 35¢ @ 25¢
 Chin 35¢ @ 25¢
 Stallion 35¢ @ 25¢

Covert Sada, Works:

Br. ast. 70¢
 Halter 70¢
 Old Hack 70¢
 Roll 70¢

Onaida C. M. Mfg. Co.:

Am. C. H. and Halters 40¢ @ 15¢ 5¢
 Am. Cow Ties 45¢ @ 30¢
 Eureka Coll. and Halters 45¢ @ 30¢ 5¢
 Niagara Coll. and Halters 45¢ @ 30¢ 5¢
 Niaga a Cow Ties 45¢ @ 30¢ 10¢ 5¢
 Wire Dog Chains 15¢ @ 30¢ 5¢
 Wire Goods Co.:

Dog Chain 60¢ @ 10¢
 Universal Dbi-Jointed Chain 50¢

Chalk—(From Jobbers.)

Carpenters' Blue gro. 12¢ @ 15¢
 Carpenters', Red gro. 37¢ @ 40¢
 Carpenters', White gro. 33¢ @ 35¢

See also Carpenters.

Chalk Lines—See Lines.**Checks, Door—**

Bardsley's 40¢ @ 10¢
 Columbia 50¢ @ 10¢
 Equipage 60¢ @ 10¢ 10¢

Chests, Tool—

American Tool Chest Co.:

Boys' Chests, with Tools 55¢
 Youths' Chests, with Tools 40¢
 Gentlemen's Chests, with Tools 30¢
 Farmers', Carpenters', etc., Chests, with Tools 30¢
 Machinists' and Pipe Fitters' Chests, Empty 30¢
 C. E. Jennings & Co.'s Machinists' Tool Chests 20¢

Chisels—

Socket Framing and Firmer

Standard List 70¢ @ 7¢ 10¢
 Buck Bros 30¢
 Charles Buck 30¢
 C. E. Jennings & Co. Socket Framing No. 10 60¢ @ 10¢
 C. E. Jennings & Co. Socket Framing No. 15 60¢ @ 10¢
 Swan 70¢ @ 10¢
 L. & J. White 80¢ @ 30¢ 5¢

Tanged—

Tanged Firmers 40¢ @ 4¢ 10¢

Buck Bros 30¢
 Charles Buck 30¢
 C. E. Jennings & Co. Nos. 10, 15, 18, 25 25¢ @ 5¢
 L. & J. White, Tanged 25¢ @ 5¢

Cold Chisels, good quality lb. 1 1/2 @ 15¢

Cold Chisels, fair quality lb. 11¢ @ 12¢

Cold Chisels, ordinary lb. 8¢ @ 9¢

Chucks—

Beach Pat., each \$5.00 20¢
 Macey's Planer and Milling 15¢ @ 25¢

Skinner Patent Chucks:

Combination Lathe Chucks 40¢
 Drill Chucks, Patent and Standard 30¢
 Drill Chucks, New Model 25¢
 Independent Lathe Chucks 40¢
 Improved Planer Chucks 25¢
 Universal Lathe Chucks 40¢
 Face Plate Jaws 40¢
 Standard Tool Co.:

Improved Drill Chuck 45¢
 Union Mfg. Co.:

Combination 40¢
 Gear Drill 30¢
 Geared Scroll 40¢
 Independent 30¢
 Universal 40¢
 Face Plate Jaws 35¢

Clamps—

Adjustable, Hammer's 20¢ @ 20¢ 5¢

Adjustable, Sargent's 50¢ @ 10¢

Carriage Makers' 40¢ @ 10¢

Darrage Makers' Sargent's 50¢ @ 10¢

Bos. Parallel 35¢ @ 10¢

Lineman's, Duca Drop Edge & Tool Co. 40¢

Saw Clamps, see Vices, 3000 5000.

Cleaners, Sid-walk—

Star Sockets, All Steel 40¢ @ 50¢ net

Star Shank, All Steel 40¢ @ 50¢ net

W. & L. S. Mfg. Co. All Steel, 7 1/2 in. x 2 in. x 3.05; 8 in. x 3.10; 8 1/2 in. x 3.25.

Cleavers, Butchers—

Foster Bros. 30¢

New Haven Edge Tool Co. 40¢

Fayette R. Plumb 33 1/2¢ @ 30¢ 10¢

P. S. & W. 50¢ @ 50¢ 10¢

L. & J. White 25¢

Gates, Molasses and Oil - Gauges -

Barrett's Comb. Roller Gauge..... 55¢ 10¢ 55¢ 10¢ 10¢
 Stanley R. & L. Co.'s Butt & Babbitt
 Gauge..... 20¢ 10¢
 Wire, Brown & Sharpe's..... 25¢
 Wire, Morse's..... 25¢
 Wire, P. S. & W. Co..... 30¢ 10¢ 10¢

Gimlets - Single Cut -

Nail, Metal, Assorted, gro. \$1.50 @ 1.60
 Nail, Metal, Assorted, gro. \$2.80 @ 3.25
 Nail, Wood Handled, Assorted, gro. \$1.75 @ 2.00

Spike, Wood Handled, Assorted

gro. \$3.25 @ 3.50

Class, American Window

Jobbers' List, Jan. 21, 1901

Less than Car Lots from Store..... 9¢
 Carloads from Store..... 9¢ 7¢ 1/2
 Car Lot Consignments, f.o.b. factory, 9¢ 12¢ 1/2

Glue - Liquid, Fish -

List A, Bottles or Cans, with Brush, 57¢ @ 50¢

List B, Cans (1/2 pts., pts., qts.), 53¢ @ 18¢

List C, Cans (1/2 gal., gal.), 35¢ @ 15¢

International Glue Co. (Martin's), 4¢ 10¢ 25¢

Glue Pots - See Pots, Glue

Common Grade, gro. \$5.00 @ 6.00

Dixon's Everlasting, in 10-pail cans, ea. \$5¢

Dixon's Everlasting, in boxes, ea. \$1.20; 2 @ \$2.00

Snow Flake

1 qt. cans, per doz. \$2.00; 2 qt., \$3.00; 1 gal. cans, per doz. \$6.00; 2 gal., \$10.00; 5 gal., \$24.00

Grindstones -

Bicycle Grindstone, 6" dia., ea. \$0.50

Bicycle Grindstones, each, \$0.50 @ 0.50

Pike Mfg. Co.

Improve 1 Family Grindstone, ea. \$2.00 @ 33¢

Pike Mfg. Co. Knife and To-1 Grinder, each, \$1.00

Velox Ball Bearing, mounted, Angle Iron Frames, each, \$3.25

Guards, Snow -

Galv. Steel 1000..... \$9.00

Cup - 1000..... \$15.00

Cup Powder - See Powder

Hack Saws - See Saws

Hacks Axl -

Pey Patent, Leather Top, \$4.50 @ 5.25

Pey Patent, Plain Top, \$3.50 @ 3.75

Seizing, Brass Ferrule, \$1.50 @ 1.60

Saddlers', Brass Ferrule, \$1.55 @ 1.65

Pey, Common, \$1.25 @ 1.35

Brad, Common, \$1.50 @ 1.75

Halters and Ties -

Web, \$4.25 @ 4.50

Jute Rope, \$4.25 @ 4.50

Sisal Rope, \$4.25 @ 4.50

Covert's Saddlery Works:

Web and Leather Halters, 70¢

Jute and Manila Rope Halters, 70¢

Sisal Rope Halters, 70¢

Jute, Manila and Cotton Rope Halters, 70¢

Sisal Rope Halters, 70¢

Hammers -

Handled Hammers -

Heller's Machinists', 50¢ @ 50¢ 55¢

Heller's Carriers', 50¢ @ 50¢ 55¢

Magnetic Tack, Nos. 1, 2, 3, \$1.25, \$1.50, \$1.75

Peck, Skow, \$1.00 @ 1.05

Payette H. Plumb:

Pumb, A. E. Hand, 33¢ @ 33¢ 10¢ 55¢

Engineers' and B. S. Hand, 50¢ @ 10¢ 10¢ 10¢ 10¢ 10¢

Machinists' Hammers, 50¢ @ 10¢ 10¢ 10¢ 10¢ 10¢

Riveting and Planers, 40¢ @ 7¢ 40¢ 10¢ 10¢ 10¢

Sargent's C. S. New List, 40¢

Heavy Hammers and Sledges -

\$1 lb. and under, lb. 45¢

\$1 to 5 lb., lb. 30¢ - 80¢ @ 30¢ 10¢

Over 5 lb., lb. 30¢

Wilkinson's Smiths', 75¢ @ 10¢ 10¢

Handcuffs and Leg Irons

See Police Goods

Handles -

Agricultural Tool Handles -

Axe, Pick, etc., 50¢ @ 50¢ 10¢

Hoe Rake, Fork, etc., 60¢ @ 50¢ 10¢

Shovel, etc., Wood D Handle, 50¢ @ 50¢

Cross-Cut Saw Handles -

Atkins', 40¢ @ 50¢

Champion, 45¢ @ 45¢ 10¢

Don't on', 50¢

Mechanics' Tool Handles -

Auger, assorted, gro. \$2.30 @ \$2.50

Brad Axl, gro. \$1.25 @ \$1.50

Chisel Handles:

Apple Tanged Firmer, gro. ass'd, \$2.25 @ \$2.50; large, \$2.50 @ \$2.75

Hickory Tanged Firmer, gro. ass'd, \$1.75 @ \$2.00; large, \$3.50 @ \$3.70

Apple Socket Firmer, gro. ass'd, \$1.70 @ \$1.85; large, \$2.00 @ \$2.25

Hickory Socket Firmer, gro. ass'd, \$1.00 @ \$1.15; large, \$1.75 @ \$2.00

Hickory Socket Framing, gro. ass'd, \$2.50 @ \$2.75; large, \$3.50 @ \$3.75

Fire, assorted, gro. \$1.00 @ \$1.15

Hammer, Hatchet, Axe, etc., 60¢

Hand Saw, Varished, doz. 70¢ @ 75¢

Not Varished, 55¢ @ 60¢

Plane Handles:

Jack, doz. 25¢; Jack Bolter, 55¢ @ 60¢

Fore, doz. 35¢ @ 38¢; Fore, Bolter, 70¢ @ 75¢

Nicholson Simplicity File Handle, 70¢ @ 75¢

gro. \$0.85 @ \$1.50

Hangers -

Barn Door, New Pattern, Round Groove, Regular:

3 4 5 6 8

1 doz. \$0.85 1.30 1.50 1.90 \$2.50

Barn Door, New England Pattern, Check Back, Regular:

3 4 5 6

Doz. \$1.50 1.75 2.50 3.00

Chicago Spring Butt Co.

Friction..... 25¢

Oscillating..... 25¢

Big Twin..... 25¢

Chisholm & Moore Mfg. Co.: 50¢

Baggage Car Door..... 40¢

Railroad..... 55¢

Columbian Hdw. Co.: 33¢ 1/2 19¢

American Trackless..... 33¢ 1/2 19¢

Crown & Hanger Co.: 60¢

Roller Bearing..... 60¢ 10¢

Lane Bros.: 40¢

Parlor Ball Bearing..... \$3.25

Parlor, Standard..... \$3.25

Parlor, New Model..... \$2.25

Parlor, New Champion..... \$2.25

Barn Door, Standard..... 50¢ 10¢ 10¢ 10¢

See List..... 60¢ 10¢

Lawrence Bros.: 60¢

Advance..... 60¢

Cleveland..... 70¢

Crown..... 60¢

New York..... 60¢

Perless..... 60¢ 10¢

Sterling..... 60¢

McKinney Mfg. Co.: 60¢ 10¢

No. 1, Special, \$15..... 60¢ 10¢

No. 2, Standard, \$15..... 60¢ 10¢

Sowell Mfg. Co.: 40¢

American Ball Bearing..... 40¢

Atlas..... 40¢

Radger Barn Door..... 40¢

Baggage Car Door..... 50¢

Climax Anti-Friction..... 50¢

Elevator..... 40¢

Express..... 40¢

Interstate..... 40¢

Lundy Parlor Door..... 70¢

M..... 50¢

Matchless..... 60¢

Nathan..... 60¢ 10¢

Railroad..... 50¢

Street Car Door..... 50¢

Steel, Nos. 600, 404, 500..... 40¢ 5¢

Stowell Parlor Door..... 50¢

West, Nos. 401, 401, 500..... 50¢

Zenith for Wood Track..... 50¢

Taylor & Boggs Foundry Co.: 50¢ 15¢ 10¢ 5¢

Wilcox Mfg. Co.: 60¢ 10¢

Bike Roller Bearing..... 60¢ 10¢

C. J. Roller Bearing..... 60¢ 10¢

Cycle Ball Bearing..... 40¢

Dwarf Ball Bearing..... 40¢

Ives, Wood Track..... 60¢ 10¢

L. Roller Bearing..... 60¢ 10¢ 5¢

New Era Roller Bearing..... 50¢ 10¢

O. K. Roller Bearing..... 60¢ 10¢ 5¢

Prindle, Wood Track..... 60¢

Richards' Wood Track..... 60¢

Richards' Steel Track..... 50¢ 10¢

Richards' Wood B. 104..... 60¢ 10¢

Tandem Nos. 1 and 2..... 60¢

Underwriters' Roller Bearing..... 40¢

Wilcox Auditorium Ball Bearing..... 30¢

Wilcox Barn Trolley No. 123..... 30¢

Wilcox Fire Trolley..... 40¢

Wilcox Le Roy Noisettes Ball Bearing..... 40¢

Wilcox New Century..... 50¢ 10¢ 10¢

Wilcox Trolley Ball Bearing..... 40¢

Harness Menders - See Menders

Harness Snaps - See Snaps

Hatches -

McKinney's Perfect Hasp 10¢ 10¢ 50¢

Wrought Hasps, Staples, etc. - See Wrought Goods

Hatchets -

Best Brands..... 60¢ @ 50¢ 10¢

Cheaper Brands..... 70¢ @ 60¢ 10¢

Note - Net prices often made.

Hay and Straw Knives - See Knives

Hinges -

Blind and Shutter Hinges -

Surface Gravity Locking Blind: (Victor; National; 1838 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No. 1..... 1 1/2 3 5

Doz. pair..... \$0.75 1.45 2.90

Mortise Shutter: (L. & P., O. S., Dixie, etc.)

No. 1..... 1 1/2 3 5

Doz. pair..... \$0.60 55¢ 1.15

Mortise Reversible Shutter, (Buffalo, etc.)

No. 1..... 1 1/2 3 5

Doz. pair..... \$0.45 60¢ 55¢

North's Automatic Blind Fixtures, No. 2, for Wood, \$9.00; Blind for Brick, \$11.50

Parlor..... 70¢ 75¢

Reading's Gravity..... 75¢ 10¢

Sargent's, Nos. 1, 3, 5, 11 & 13..... 70¢ 10¢ 70¢ 20¢

Stanley's Steel Gravity Blind Hinges, 1/2 doz. sets, without screws, \$3.50; with screws, \$1.15

Wrightsville Hardware Co.: 80¢ 1/2 1/2

A. S. Lull & Porter..... 75¢ 10¢

Queen City Reversible..... 75¢ 10¢

Blenger's Positive Locking, No. 1 & 3..... 70¢ 10¢ 55¢

Shepard's Noiseless, Nos. 60, 65, 55..... 70¢ 10¢

Niagara Gravity Locking, Nos. 1, 3 & 5..... 75¢ 75¢

1908, Old Patn. Nos. 1, 3 & 5..... 75¢ 75¢

Old Patn. Nos. 1, 3 & 5..... 75¢ 75¢

Buffalo Gravity Locking, Nos. 1, 3 & 5..... 75¢ 75¢

Sh-pard's Double Locking, No. 20 & 25..... 70¢ 10¢

Champion Gravity Locking, No. 75..... 75¢ 75¢

Steamboat Gravity Locking, No. 10..... 75¢ 75¢

Pioneer, Nos. 60, 45 & 55..... 75¢ 75¢

Empire, Nos. 101 & 103..... 70¢ 75¢

W. H. Co.'s Mortise Gravity Locking, No. 2..... 60¢ 10¢

Gate Hinges -

Clark's or Shepard's - Doz. sets: 1 2 3

Hinges with Latches, \$1.50 1.50 2.65

Hinges only..... \$1.50 1.50 2.00

Latches only..... 50¢ 60¢ 65¢

New England:

With Latch..... doz. @ \$1.50

Without Latch..... doz. @ \$1.25

Reversible Self-Closing:

With Latch..... doz. @ \$1.50

Without Latch..... doz. @ \$1.45

Western:

With Latch..... doz. \$1.00 @ 1.75

Without Latch..... doz. \$0.95 @ 1.30

Wrightsville Hardware Co.: 30¢

Shepard's or Clark's, doz. sets, 30¢

No. 1 2 3

Hinges with Latches, \$1.80 2.00 2.75

Hinges only..... 1.30 1.40 2.10

Latches only..... 75¢ 85¢ 70¢

Spring Hinges -

Ladies' Melting—
 A. C. & W. Co. 25¢
 Reading 50¢
 Sargent & Co. 40¢
Lanterns—Tubular—
 Regular 12 in. 40¢
 Side Lift Tubular 40¢
 Square Lift Tubular 40¢
 Other styles 40¢
Bull's Eye Police—
 No. 1, 2 1/2 inch 50¢
 No. 2, 3 inch 50¢
Latches, Thumb—
 Roggen's Latches 50¢
Lawn Mowers—
 See Mowers, Lawn.
Leaders, Cattle—
 Small 50¢
 Covert Mfg. Co. 50¢
Lemon Squeezers—
 See Squeezers, Lemon.
Lifters, Transom—
 Bond Grip, Rayson Mfg. Co. 80¢
Lines—
 Wire Clothes, Nos. 18 19 20
 100 feet 2.00 2.00 1.65
 75 feet 1.50 1.70 1.30
Oceanway Mills—
 Crown Solid Braided Chalk 30¢
 Mason's, No. 0 to No. 5 30¢
 Solid Braided Chalk, No. 0 to 5 10¢
 Silver Lake Braided Chalk, No. 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100 10¢
Locks—Cabinet—
 Cabinet Locks 30¢
Door Locks, Latches, &c.—
 [Net prices are very often made on these goods.]
 Reading Hardware Co. 50¢
 R. & E. Mfg. Co. 50¢
 Sargent & Co. 40¢
Elevator—
 Stowell's 40¢
Padlocks—
 Wrought Iron 70¢
 R. & E. Mfg. Co. Wrt. Steel and Brass 50¢
Sash, &c.—
 Fitch's 60¢
 Bronze and Brass 60¢
 Iron 70¢
 Ives Patent 60¢
 Bronze and Brass 60¢
 Iron 70¢
 Wrought Bronze and Brass 60¢
 Wrought Steel 60¢
 Payson's Signal 60¢
Machines—Boring—
 Common, Upright, Without Augers 50¢
 Common, Angular, Without Augers 50¢
 R. & E. Mfg. Co. Upright 50¢
 Improved No. 3 50¢
 Improved No. 4 50¢
 Improved No. 5 50¢
 Jennings' 50¢
 Millers' Falls 50¢
 Smith's, Rice's Pat. 50¢
 Swan's, No. 500 50¢
Hoisting—
 Moore's Anti-Friction Differential Pulley Block 50¢
 Moore's Hand Hoist, with Lock Brake 50¢
 Moore's Portable Pneumatic Hoist 50¢
Ice Cutting—
 Chandler's 50¢
Washing—
 Wayne American 50¢
 Western Star, No. 3 50¢
 Western Star, No. 4 50¢
 St. Louis, No. 41 50¢
Mallets—
 Hickory 50¢
 Lignumvitae 50¢
 Tanners', Hickory and Applewood 50¢
Mats—Door—
 Elastic steel (W. G. Co.) 10¢
Mattocks—
 See Picks and Mattocks.
Meat Cutters—
 See Cutters, Meat.
Milk Cans—See Cans, Milk—
 Enterprise Mfg. Co. 50¢
 National, list Jan. 1, 1901 50¢
 Parker's Columbia and Victoria 50¢
Parker's Box and Side—
 Swift, Lane Bros. 50¢
Mincing Knives—
 See Knives, Mincing.
Molasses Cates—
 See Gates, Molasses.
Money Drawers—
 See Drawers, Money.
Mowers, Lawn—
 Net prices are generally quoted.
 Cheap 10¢
 Good 10¢
 High Grade 4.25 4.50 4.75 5.00
 Continental 60¢
 Great American 60¢
 Great American Ball Bearing 60¢
 Quaker City 60¢
 Pennsylvania 60¢
 Pennsylvania Golf 60¢
 Pennsylvania Horse 60¢
 Pennsylvania Pony 60¢
 Philadelphia 60¢
 Styles M., S., C., K., T. 60¢
 Style A, all Steel 60¢
 Style E, Low Wheel 60¢
 Style E, High Wheel 60¢
 Drexel and Gold Coin, low list 60¢

Hungarian, Finishing, Upholsterers', &c. See Tacks.
Horse—
 Nos. 6 7 8 9 10
 A. C. 25¢ 25¢ 25¢ 25¢ 25¢
 Ausable 25¢ 25¢ 25¢ 25¢ 25¢
 Capwell 10¢ 10¢ 10¢ 10¢ 10¢
 C. B. K. 25¢ 25¢ 25¢ 25¢ 25¢
 Champin 25¢ 25¢ 25¢ 25¢ 25¢
 Clinton 10¢ 10¢ 10¢ 10¢ 10¢
 Maud 25¢ 25¢ 25¢ 25¢ 25¢
 Neponset 25¢ 25¢ 25¢ 25¢ 25¢
 Putnam 25¢ 25¢ 25¢ 25¢ 25¢
 Vulcan 25¢ 25¢ 25¢ 25¢ 25¢
 American, Nos. 5 to 10 25¢
 Jobbers' special brands, per lb. 8¢
Picture—
 Brass Head 10¢
 Por. Head 10¢
Nippers, See Pliers and Nippers.
Nut Crackers—
 See Crackers, Nut.
Nuts—
 Cold Punched 10¢
 Mfrs. or U. S. Standard 10¢
 Square, plain 10¢
 Hexagon, plain 10¢
 Square, C. T. & R. 10¢
 Hexagon, C. T. & R. 10¢
Hot Pressed—
 Mfrs., U. S. or Nar. Gauge Stan'd. 10¢
 Square Blank 10¢
 Hexagon Blank 10¢
 Square Tapped 10¢
 Hexagon Tapped 10¢
Oakum—
 Best or Government 10¢
 Navy 10¢
 U. S. Navy 10¢
 Plumbers' Spun Oakum 10¢
 In carload lots 1/4 lb. off f.o.b. New York.
Oil Axle—
 Snow Flake 10¢
 1 qt. cans, per doz. 10¢
 1 gal. cans, per doz. 10¢
Oil Tanks—See Tanks, Oil.
Oilers—
 Brass and Copper 10¢
 Tin or Steel 10¢
 Zinc 10¢
 Paragon 10¢
 Brass and Copper 10¢
 Tin or Steel 10¢
 Zinc 10¢
 Malleable, Hammers' Improved, No. 1 10¢
 No. 2, 3, 4, 5, 6, 7, 8, 9, 10 10¢
 Malleable, Hammers' Old Pattern, same list 10¢
 Wilcox & Hobbs Mfg. Co. 10¢
 Spring Bottom Cans 10¢
 Railroad Oilers etc. 10¢
Oponers—Can—
 French 10¢
 Iron Handle 10¢
 Sprague, Iron Handle, per doz. 10¢
 Sardine Scissors 10¢
 Tip Top 10¢
 National, per doz. 10¢
 Stowell's, per doz. 10¢
 Waldorf, per doz. 10¢
Egg—
 Nickel Plate 10¢
 Silver Plate 10¢
Packing—
 Asbestos Packing, Wick and Rope, 15¢
Rubber—
 Sheet, C. I. 10¢
 Sheet, C. O. S. 10¢
 Sheet, C. B. S. 10¢
 Sheet, Pure Gum 10¢
 Sh. et. Red 10¢
 Jenkins' Standard, per 80¢
Miscellaneous—
 American Packing 10¢
 Cotton Packing 10¢
 Italian Packing 10¢
 Jute 10¢
 Russia Packing 10¢
Pails—Creamery—
 A. & Co., with gauges, No. 1 10¢
 No. 2, 10¢
Galvanized—
 Price per gro. 10 15 16
 Water, Regular 10 15 16
 Water, Heavy 10 15 16
 Fire, Rd. Bottom 10 15 16
 Well 10 15 16
Pans—Dripping—
 Standard List 10¢
Fry—
 Common Lipped 10¢
 No. 1 10¢
 No. 2 10¢
 No. 3 10¢
 No. 4 10¢
 No. 5 10¢
 No. 6 10¢
 No. 7 10¢
 No. 8 10¢
 No. 9 10¢
 No. 10 10¢
Roasting and Baking—
 Real, S. S. & Co., per doz. 10¢
 10 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
Paper—Building Paper—
 Asbestos 10¢
 Building Felt 10¢
 Mill Board, sheet, 10 to 10 inches 10¢
 Mill Board, roll, thicker than 1-16 inch 10¢
 Mill Board, roll, 1-16 in. thick and less 10¢
 Rosin Sized Sheathing 10¢
 Light wt. 10 lbs. to roll 10¢
 Medium wt. 10 lbs. to roll 10¢
 Heavy wt. 10 lbs. to roll 10¢
 Medium Grades Water Proof Sheathing 10¢
 Deafening Felt, 3, 6 and 1 1/2 sq. ft. to lb., ton 10¢

Red Rope Roofing, 250 sq. feet per roll. 1.65
Tarred Paper—
 1 ply (roll 300 sq. ft.), ton 1.65
 2 ply, roll 100 sq. ft. 1.65
 3 ply, roll 100 sq. ft. 1.65
 Stater's Felt (roll 500 sq. ft.), 50¢
 R. K. Stone Surface Roofing (roll 110 sq. ft.) 1.65
Sand and Emery—
 List Dec. 25, 1899 10¢
Parers—Apple—
 Advance 10¢
 Baldwin 10¢
 Bonanza 10¢
 Dandy 10¢
 Eureka, 1898 10¢
 Family Bay State 10¢
 Hudson's Little Star 10¢
 Hudson's Hocking Table 10¢
 Improved Bay State 10¢
 New Lightnings 10¢
 Reading 78 10¢
 Reading 78 10¢
 Turn Table 98 10¢
 White Mountain 10¢
Potato—
 Saratoga 10¢
 White Mountain 10¢
Picks and Mattocks—
 List Feb. 23, 1899 10¢
Pigeons—Clay
 Markie's Black Birds, f.o.b. factory, per m. 10¢
 See also Traps, Target.
Pinking Irons—
 See Irons, Pinking.
Pins—Escutcheon—
 Brass 10¢
 Iron, list Nov. 11, '85 10¢
Pipe, Cast Iron Soil—
 Standard, 2-6 in. 10¢
 Extra Heavy, 2-6 in. 10¢
 Fittings 10¢
 NOTE—Carload lots to jobbers 10¢ less, and freight allowed.
Pipe, Merchant, Boiler Tubes, &c.—
 Less than Carloads to Consumers.
 Merchant Pipe 10¢
 Black, 10¢
 Galva, 10¢
 1/2 to 1/4 inch 10¢
 3/4 to 1/2 inch 10¢
 Boiler Tubes 10¢
 Steel 10¢
 1 to 1 1/2 inch and 2 1/4 to 5 inch inclusive 10¢
 2 to 2 1/2 inch, inclusive 10¢
 6 to 10 inches 10¢
 1 to 1 1/2 inch and 2 1/4 in. 10¢
 2 1/4 to 3 1/2 inch 10¢
 3 1/2 to 4 1/2 inch 10¢
 4 1/2 to 12 1/2 inch 10¢
 Casing, Cut Lengths, S. & S. 10¢
 2 to 3 inch 10¢
 3 1/2 to 4 1/2 inch 10¢
 4 1/2 to 12 1/2 inch 10¢
 NOTE—Prices are largely nominal owing to scarcity of Pipe. Jobbers are obtaining almost any price they ask.
Pipe, Sewer—
 Standard Pipe and Fittings, 2 to 2 1/2 in. New England 10¢
 New York and New Jersey 10¢
 Ohio and Michigan 10¢
 Carload lots are generally delivered.
Planes and Plane Irons—
 Wood Planes—
 Molding 10¢
 Bench, First quality 10¢
 Bench, Second quality 10¢
 Bailey's (Stanley R. & L. Co.) 10¢
 Gage Self Setting 10¢
 Iron Planes—
 Bailey's (Stanley R. & L. Co.) 10¢
 Chaplin's Iron Planes 10¢
 Miscellaneous Planes (Stanley R. & L. Co.) 10¢
 Sargent's 10¢
Plane Irons—
 Wood Bench Plane Irons 10¢
 Buck Bros 10¢
 Stanley R. & L. Co. 10¢
 L. & J. J. White 10¢
Planters, Corn, Hand.
 Kohler's Eclipse 10¢
Plates—
 Felloe 10¢
 Self-Sealing Pie Plates (S. S. & Co.) 10¢
Pliers and Nippers—
 Button Pliers 10¢
 Gas Burner, per doz., 5 in., 1.15¢
 Gas Pipe, 7 8 10 12 in. 1.15¢
 Acme Nippers 10¢
 Bernard's 10¢
 Parallel Pliers, &c. 10¢
 Pliers, Pattern 10¢
 Elm City Fence Pliers 10¢
 Cronk Hanger Co. 10¢
 American Button 10¢
 Cronk's 10¢
 Improved Button 10¢
 Combination and Others 10¢
 Heller's Farriers' Nippers, Pincers and Tools 10¢
 P. & W. Tanners' Cutting Nippers 10¢
 Swedish Side, End and Diagonal Cutting Pliers 10¢
 Utica Drop Forge & Tool Co. 10¢
 Pliers and Nippers, all kinds 10¢
Plumbs and Levels—
 Davis Iron, Machinist Nos. 1 to 14 10¢
 Davis Iron, Adjustable Nos. 5 to 49 10¢
 Disston's 10¢
 Pocket Levels 10¢
 Stanley K. & L. Co. 10¢
 Stanley's Duplex 10¢
 Woods' Extension 10¢
Poachers, Egg—
 Buffalo Steam Egg Poachers 10¢
 No. 1, 7.30; No. 2, 11.00 No. 3, 11.00; No. 4, 11.50.
Points, Claziers—
 Bulk and 1 lb. papers 10¢
 1/2 lb. papers 10¢
 1/4 lb. papers 10¢
Pokes, Animal—
 Ft. Madison Hawkeye 10¢
 Ft. Madison, Western 10¢
Police Goods—
 Manufacturers' Lists 10¢
Polish—Metal—
 Prestoline Liquid, No. 1 (1/2 pt.) 10¢
 No. 2 (1 qt.), 10¢
 Prestoline Paste 10¢
 George William Hoffman 10¢
 U. S. Metal Polish Paste, 3 oz. boxes, 10¢
 50¢; 1 lb. boxes, 10¢
 1 lb. boxes, 10¢
 U. S. Liquid, 8 oz. cans, 10¢
 Wynn's Friend Metal Polish, per doz. 10¢
 Wynn's White Silk, 1/2 pt. cans, 10¢
Stove—
 Black Eagle Benzine Paste, 5 lb. cans 10¢
 Black Eagle, Liquid, 1/2 pt. cans 10¢
 Black Jack Paste, 1/2 lb. cans 10¢
 Ladd's Black Beauty, 1/2 lb. cans 10¢
 Joseph Dixon's, 1/2 lb. cans 10¢
 Dixon's Plumbago 10¢
 Fireside 10¢
 Gem, 1/2 lb. cans 10¢
 Japanese 10¢
 Jet Black 10¢
 Peerless Iron Enamel, 1/2 pt. cans 10¢
 Wynn's 10¢
 Black Silk, 5 lb. pail 10¢
 Black Silk, 1/2 lb. box 10¢
 Black Silk, 1 lb. box 10¢
 Black Silk, 1/2 pt. liq. 10¢
Poppers, Corn—
 Round or Square 10¢
 1 qt. 10¢
 1 1/2 qt. 10¢
 2 qt. 10¢
Post Hole and Tree Augers and Diggers—
 See also Diggers, Post Hole, &c.
Potato Parers—
 See Parers, Potato.
Pots—Glue—
 Enameled 10¢
 Tinned 10¢
Powder—
 In Canisters 10¢
 Duck, 1 lb. each 10¢
 Fine Sporting, 1 lb. each 10¢
 Rifle, 1/2 lb. each 10¢
 Rifle, 1 lb. each 10¢
In Kegs:
 Duck, 6 1/2 lb. kegs 10¢
 Duck, 12 1/2 lb. kegs 10¢
 Duck, 25 lb. kegs 10¢
 Rifle, 6 1/2 lb. kegs 10¢
 Rifle, 12 1/2 lb. kegs 10¢
 Rifle, 25 lb. kegs 10¢
King's Semi-Smokeless:
 Keg (25 lb. bulk) 10¢
 Half Keg (12 1/2 lb. bulk) 10¢
 Quarter Keg (6 1/2 lb. bulk) 10¢
 Case 24 (1 lb. cans bulk) 10¢
 Half case (1 lb. cans bulk) 10¢
 King's Smokeless Shot Gun Rifle 10¢
 Keg (25 lb. bulk) 10¢
 Half Keg (12 1/2 lb. bulk) 10¢
 Quarter Keg (6 1/2 lb. bulk) 10¢
 Case 24 (1 lb. cans bulk) 10¢
 Half case (1 lb. cans bulk) 10¢
Presses—
 Fruit and Jelly—
 Enterprise Mfg. Co. 10¢
Pruning Hooks and Shears—See Shears.
Pullers, Nail—
 Smith & Hemenway Co. 10¢
 Diamond B. No. 2 10¢
 Diamond B. No. 3 10¢
 Giant, No. 1 10¢
 Miller's Falls, No. 3, per doz. 10¢
Pulley—
 Polisan 10¢
 Soranton Case Lots 10¢
 No. 1 (large), 10¢
 No. 2 (large), 10¢
 No. 3 (small), 10¢
 No. 4 (small), 10¢
 No. 5 (small), 10¢
 No. 6 (small), 10¢
Pulleys—Single Wheel—
 In 10¢
 Avening 10¢
 Hay Fork, Swivel or Solid Eye 10¢
 Hot House, doz 10¢
 Screw 10¢
 Side 10¢
 Tackle 10¢
 Stowell's 10¢
 Ceiling or End, Anti-Friction 10¢
 Dumb Walter, Anti-Friction 10¢
 Hay Fork, Anti-Friction, 5-in. Wheel 10¢
 Electric Light 10¢
 Side, Anti-Friction 10¢
Sash Pulleys—
 Common Frame: Square or Round End per doz., 1 1/2 in., 15¢; 2 in., 15¢; 2 1/2 in., 15¢; 3 in., 15¢; 3 1/2 in., 15¢; 4 in., 15¢; 4 1/2 in., 15¢; 5 in., 15¢; 5 1/2 in., 15¢; 6 in., 15¢; 6 1/2 in., 15¢; 7 in., 15¢; 7 1/2 in., 15¢; 8 in., 15¢; 8 1/2 in., 15¢; 9 in., 15¢; 9 1/2 in., 15¢; 10 in., 15¢; 10 1/2 in., 15¢; 11 in., 15¢; 11 1/2 in., 15¢; 12 in., 15¢; 12 1/2 in., 15¢; 13 in., 15¢; 13 1/2 in., 15¢; 14 in., 15¢; 14 1/2 in., 15¢; 15 in., 15¢; 15 1/2 in., 15¢; 16 in., 15¢; 16 1/2 in., 15¢; 17 in., 15¢; 17 1/2 in., 15¢; 18 in., 15¢; 18 1/2 in., 15¢; 19 in., 15¢; 19 1/2 in., 15¢; 20 in., 15¢; 20 1/2 in., 15¢; 21 in., 15¢; 21 1/2 in., 15¢; 22 in., 15¢; 22 1/2 in., 15¢; 23 in., 15¢; 23 1/2 in., 15¢; 24 in., 15¢; 24 1/2 in., 15¢; 25 in., 15¢; 25 1/2 in., 15¢; 26 in., 15¢; 26 1/2 in., 15¢; 27 in., 15¢; 27 1/2 in., 15¢; 28 in., 15¢; 28 1/2 in., 15¢; 29 in., 15¢; 29 1/2 in., 15¢; 30 in., 15¢; 30 1/2 in., 15¢; 31 in., 15¢; 31 1/2 in., 15¢; 32 in., 15¢; 32 1/2 in., 15¢; 33 in., 15¢; 33 1/2 in., 15¢; 34 in., 15¢; 34 1/2 in., 15¢; 35 in., 15¢; 35 1/2 in., 15¢; 36 in., 15¢; 36 1/2 in., 15¢; 37 in., 15¢; 37 1/2 in., 15¢; 38 in., 15¢; 38 1/2 in., 15¢; 39 in., 15¢; 39 1/2 in., 15¢; 40 in., 15¢; 40 1/2 in., 15¢; 41 in., 15¢; 41 1/2 in., 15¢; 42 in., 15¢; 42 1/2 in., 15¢; 43 in., 15¢; 43 1/2 in., 15¢; 44 in., 15¢; 44 1/2 in., 15¢; 45 in., 15¢; 45 1/2 in., 15¢; 46 in., 15¢; 46 1/2 in., 15¢; 47 in., 15¢; 47 1/2 in., 15¢; 48 in., 15¢; 48 1/2 in., 15¢; 49 in., 15¢; 49 1/2 in., 15¢; 50 in., 15¢; 50 1/2 in., 15¢; 51 in., 15¢; 51 1/2 in., 15¢; 52 in., 15¢; 52 1/2 in., 15¢; 53 in., 15¢; 53 1/2 in., 15¢; 54 in., 15¢; 54 1/2 in., 15¢; 55 in., 15¢; 55 1/2 in., 15¢; 56 in., 15¢; 56 1/2 in., 15¢; 57 in., 15¢; 57 1/2 in., 15¢; 58 in., 15¢; 58 1/2 in., 15¢; 59 in., 15¢; 59 1/2 in., 15¢; 60 in., 15¢; 60 1/2 in., 15¢; 61 in., 15¢; 61 1/2 in., 15¢; 62 in., 15¢; 62 1/2 in., 15¢; 63 in., 15¢; 63 1/2 in., 15¢; 64 in., 15¢; 64 1/2 in., 15¢; 65 in., 15¢; 65 1/2 in., 15¢; 66 in., 15¢; 66 1/2 in., 15¢; 67 in., 15¢; 67 1/2 in., 15¢; 68 in., 15¢; 68 1/2 in., 15¢; 69 in., 15¢; 69 1/2 in., 15¢; 70 in., 15¢; 70 1/2 in., 15¢; 71 in., 15¢; 71 1/2 in., 15¢; 72 in., 15¢; 72 1/2 in., 15¢; 73 in., 15¢; 73 1/2 in., 15¢; 74 in., 15¢; 74 1/2 in., 15¢; 75 in., 15¢; 75 1/2 in., 15¢; 76 in., 15¢; 76 1/2 in., 15¢; 77 in., 15¢; 77 1/2 in., 15¢; 78 in., 15¢; 78 1/2 in., 15¢; 79 in., 15¢; 79 1/2 in., 15¢; 80 in., 15¢; 80 1/2 in., 15¢; 81 in., 15¢; 81 1/2 in., 15¢; 82 in., 15¢; 82 1/2 in., 15¢; 83 in., 15¢; 83 1/2 in., 15¢; 84 in., 15¢; 84 1/2 in., 15¢; 85 in., 15¢; 85 1/2 in., 15¢; 86 in., 15¢; 86 1/2 in., 15¢; 87 in., 15¢; 87 1/2 in., 15¢; 88 in., 15¢; 88 1/2 in., 15¢; 89 in., 15¢; 89 1/2 in., 15¢; 90 in., 15¢; 90 1/2 in., 15¢; 91 in., 15¢; 91 1/2 in., 15¢; 92 in., 15¢; 92 1/2 in., 15¢; 93 in., 15¢; 93 1/2 in., 15¢; 94 in., 15¢; 94 1/2 in., 15¢; 95 in., 15¢; 95 1/2 in., 15¢; 96 in., 15¢; 96 1/2 in., 15¢; 97 in., 15¢; 97 1/2 in., 15¢; 98 in., 15¢; 98 1/2 in., 15¢; 99 in., 15¢; 99 1/2 in., 15¢; 100 in., 15¢; 100 1/2 in., 15¢; 101 in., 15¢; 101 1/2 in., 15¢; 102 in., 15¢; 102 1/2 in., 15¢; 103 in., 15¢; 103 1/2 in., 15¢; 104 in., 15¢; 104 1/2 in., 15¢; 105 in., 15¢; 105 1/2 in., 15¢; 106 in., 15¢; 106 1/2 in., 15¢; 107 in., 15¢; 107 1/2 in., 15¢; 108 in., 15¢; 108 1/2 in., 15¢; 109 in., 15¢; 109 1/2 in., 15¢; 110 in., 15¢; 110 1/2 in., 15¢; 111 in., 15¢; 111 1/2 in., 15¢; 112 in., 15¢; 112 1/2 in., 15¢; 113 in., 15¢; 113 1/2 in., 15¢; 114 in., 15¢; 114 1/2 in., 15¢; 115 in., 15¢; 115 1/2 in., 15¢; 116 in., 15¢; 116 1/2 in., 15¢; 117 in., 15¢; 117 1/2 in., 15¢; 118 in., 15¢; 118 1/2 in., 15¢; 119 in., 15¢; 119 1/2 in., 15¢; 120 in., 15¢; 120 1/2 in., 15¢; 121 in., 15¢; 121 1/2 in., 15¢; 122 in., 15¢; 122 1/2 in., 15¢; 123 in., 15¢; 123 1/2 in., 15¢; 124 in., 15¢; 124 1/2 in., 15¢; 125 in., 15¢; 125 1/2 in., 15¢; 126 in., 15¢; 126 1/2 in., 15¢; 127 in., 15¢; 127 1/2 in., 15¢; 128 in., 15¢; 128 1/2 in., 15¢; 129 in., 15¢; 129 1/2 in., 15¢; 130 in., 15¢; 130 1/2 in., 15¢; 131 in., 15¢; 131 1/2 in., 15¢; 132 in., 15¢; 132 1/2 in., 15¢; 133 in., 15¢; 133 1/2 in., 15¢; 134 in., 15¢; 134 1/2 in., 15¢; 135 in., 15¢; 135 1/2 in., 15¢; 136 in., 15¢; 136 1/2 in., 15¢; 137 in., 15¢; 137 1/2 in., 15¢; 138 in., 15¢; 138 1/2 in., 15¢; 139 in., 15¢; 139 1/2 in., 15¢; 140 in., 15¢; 140 1/2 in., 15¢; 141 in., 15¢; 141 1/2 in., 15¢; 142 in., 15¢; 142 1/2 in., 15¢; 143 in., 15¢; 143 1/2 in., 15¢; 144 in., 15¢; 144 1/2 in., 15¢; 145 in., 15¢; 145 1/2 in., 15¢; 146 in., 15¢; 146 1/2 in., 15¢; 147 in., 15¢; 147 1/2 in., 15¢; 148 in., 15¢; 148 1/2 in., 15¢; 149 in., 15¢; 149 1/2 in., 15¢; 150 in., 15¢; 150 1/2 in., 15¢; 151 in., 15¢; 151 1/2 in., 15¢; 152 in., 15¢; 152 1/2 in., 15¢; 153 in., 15¢; 153 1/2 in., 15¢; 154 in., 15¢; 154 1/2 in., 15¢; 155 in., 15¢; 155 1/2 in., 15¢; 156 in., 15¢; 156 1/2 in., 15¢; 157 in., 15¢; 157 1/2 in., 15¢; 158 in., 15¢; 158 1/2 in., 15¢; 159 in., 15¢; 159 1/2 in., 15¢; 160 in., 15¢; 160 1/2 in., 15¢; 161 in., 15¢; 161 1/2 in., 15¢; 162 in., 15¢; 162 1/2 in., 15¢; 163 in., 15¢; 163 1/2 in., 15¢; 164 in., 15¢; 164 1/2 in., 15¢; 165 in., 15¢; 165 1/2 in., 15¢; 166 in., 15¢; 166 1/2 in., 15¢; 167 in., 15¢; 167 1/2 in., 15¢; 168 in., 15¢; 168 1/2 in., 15¢; 169 in., 15¢; 169 1/2 in., 15¢; 170 in., 15¢; 170 1/2 in., 15¢; 171 in., 15¢; 171 1/2 in., 15¢; 172 in., 15¢; 172 1/2 in., 15¢; 173 in., 15¢; 173 1/2 in., 15¢; 174 in., 15¢; 174 1/2 in., 15¢; 175 in., 15¢; 175 1/2 in., 15¢; 176 in., 15¢; 176 1/2 in., 15¢; 177 in., 15¢; 177 1/2 in., 15¢; 178 in., 15¢; 178 1/2 in., 15¢; 179 in., 15¢; 179 1/2 in., 15¢; 180 in., 15¢; 180 1/2 in., 15¢; 181 in., 15¢; 181 1/2 in., 15¢; 182 in., 15¢; 182 1/2 in., 15¢; 183 in., 15¢; 183 1/2 in., 15¢; 184 in., 15¢; 184 1/2 in., 15¢; 185 in., 15¢; 185

Jobbers \$0.50@1.00, and Common, Plain
Shells are generally sold by jobbers
at about \$1.00.

Sieves and Sifters—
Hunter's Imitation, gro. \$11.00@11.50
Buffalo Metallic Blue, S. S. & Co., per gr.
14x16 16x18 18x20
\$12.00 \$13.80 \$15.00
E. J. Meyers' Mfg. Co.:
Electric Light..... per gr. \$11.00
Hunter's genuine..... per gr. \$12.50
No Name, Hunter's..... per gr. \$11.00
Standard..... per gr. \$11.00
Shaker (Harler's Pat.) Flour Sifters.....
per doz. \$2.00

Sieves, Tin Rim—
Per dozen
Mesh..... 1 16 13 20
Black full size..... \$0.95 98 1.00 1.10
1/2 latel, full size..... \$1.05 1.05 1.10 1.20
Black, scant..... \$0.75 .80 .85

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested, doz..... \$1.05@1.75
Mesh 20, Nested, doz..... \$1.05@1.75
Mesh 24, Nested, doz..... \$1.05@1.75

Sinks—
Cast Iron—
Standard list..... 65¢@1.70. A
NOTE.—There is not entire uniformity
in sizes used by jobbers.

Wrought Steel—
New Era, Galv'd and Enamelled..... 70¢@75¢
New Era, Painted..... 60¢@65¢
L. & G. Mfg. Co., Galvanized..... 50¢
L. & G. Mfg. Co., Enamelled..... 50¢

Skels, Wagon—
Cast Iron..... 70¢@1.00
Malleable Iron..... 40¢@1.00
Steel..... 40¢@1.00

Slates—
Factory Shipments.
"D" Slates..... 50¢@1.00@1.05
Unexcelled, etc., Noiseless Slates, 6 1/2
x 8 ten's..... 8 ten's \$
Victoria, etc., Noiseless Slates, 7 ten's 4 1/2
x 8..... 7 ten's \$
Wire Bound..... 50¢@1.00
Web Hinge..... 5¢

Slaw Cutters—See Cutters.
Slicers, Vegetable—
Stirling \$2.00..... 33¢

Snaps, Harness—
G. T. Man..... 40¢@1.00@1.05

Covert Mfg. Co.:
Deroy..... 35¢@25¢
High Grade..... 45¢@25¢
Jockey..... 4 1/2 x 2 1/2
Trojan..... 4 1/2 x 2 1/2
Yankee..... 3 1/2 x 2 1/2
Yankee, Roller..... 3 1/2 x 2 1/2

Cover's Saddlery Works:
Crown..... 60¢
German..... 60¢
Model..... 60¢
Triumph..... 60¢

W. & T. H. Co.:
Bristol..... 40¢@1.00
Empire..... 50¢@55¢
German..... 50¢@55¢
National..... 50¢@55¢
Perfect..... 50¢@55¢
Clipper..... 50¢@55¢
Champion..... 40¢
Security..... 40¢
Victor..... 60¢@55¢
Onela Community..... 65¢@65¢ 0¢
Solid Silver..... 65¢@1.00@1.05
Sargent's Patent Guard..... 60¢@1.00

Snaths—
Scythe..... 60¢

Snips, Tinners—See Shears
Soldering Irons—
See Irons, Soldering.

Spoke Trimmers—
See Trimmers, Spoke.

Spoons and Forks—
Silver Plated.

Good Quality..... 50¢@1.00@1.05
Cheap..... 40¢@1.00@1.05
International..... 40¢@1.00@1.05
1847 Rogers Bros. and Rogers & Hamilton..... 40¢@1.00
Rogers & Bros., William Rogers & Co. Inc..... 40¢@1.00
Brand..... 40¢@1.00
Anchor, Rogers Brand..... 40¢@1.00
Wm. Rogers & Son..... 40¢@1.00
Simson L. & Geo. F. Rogers Co..... 40¢@1.00
Silver Plated Flat Ware..... 60¢@1.00
No. 17 Silver Plated Ware..... 60¢@1.00

Miscellaneous—
German Silver..... 60¢@1.00@1.05
Simson L. & Geo. F. Rogers Co..... 40¢@1.00
German or Nickel Silver, Special list..... 1 1/2@1.05

Tinned Iron—
Teas..... per gro. 45¢@50¢
Tubles..... per gro. 90¢@1.00

Springs—
Door—
Gem (Coll.)..... 20¢
Star (Coll.)..... 30¢
Torrer's Coll. 30 in..... per doz. \$11.00@1.25
Victor (Coll.)..... 50¢@1.00@1.05

Carriage, Wagon, &c.
14 in. and wider:
Black or 1/4 Bright, lb..... 1/4¢
Bright, lb..... 1/4¢

Painted Slat Springs:
1 1/2 x 2 1/2 and smaller, per pr 50¢@55¢
1 1/2 x 2 1/2 per pr..... 55¢@60¢
1 1/2 x 3 x 28 and narrower, per pr..... 80¢@85¢

Sprinklers, Lawn—
Enterprise..... 25¢@20¢
Philadelphia No. 1, per doz. \$12; No. 2,
\$15; No. 3, \$24..... 30¢

Squares—
Nickel plated..... List Jan. 5, 1901
Steel and Iron..... 7¢@10¢@75¢
Rosewood Hdl. Try Square and T-Bevels.....
60¢@1.00@1.05
Iron Hdl. Try Squares and T-Bevels.....
40¢@1.00@1.05
D'Arson's Try Sq. and T-Bevels..... 60¢@1.00
W. H. Bottom's Try and Miter..... 50¢@1.00

Squeezers

Lemon—
Wood, Common, gro., No. 6, \$5.25
@5.50; No. 1, \$6.25@6.50.
Wood, Porcelain Lined:
Cheap..... doz. \$2.00@2.75
Good Grade..... doz. \$3.00@3.50
Tinned Iron..... doz. \$0.75@1.25
Iron, Porcelain Lined doz. \$3.90@3.25
Jennings' Star..... per doz. \$1.85@1.90

Staples—
Barbed Blind..... lb. 7¢@7 1/4¢
Electricians' Association list.....
80¢@10¢@10 1/2¢
Fence Staples, same price as Barbed
Wire. See Trade Report.
Poultry Netting, Staples..... per lb. 25¢

Grand Crossing Tack Co.'s list..... 80¢@10¢

Steels, Butchers'—
Dick's..... 30¢
Foster Bros..... 30¢
Hartley Cutlery Co..... 40¢@50¢
C. & A. Hoffmann's..... 40¢

Steelyards..... 25¢@25¢@10¢

Stocks and Dies—
Blacksmiths'..... 40¢@1.00@1.05
Gardner Die Works..... 50¢
Gar 1 per Die Stocks, larger size..... 40¢
Gr-on River..... 25¢@50¢
Lightning Screw Plate..... 25¢
L't le Giant..... 25¢
Re ce's New Screw Plates..... 25¢@30¢
Curtis Reversible Ratchet Die Stock..... 25¢

Scythe Stones—
Chicago Wheel & Mfg. Co.:
Gem Corundum, 9 inch, \$3.00 per
gro., 12 inch, \$10.00

Pike Mfg. Co. 1901 list:
Black Diamond S. S..... per gro. \$12.00
Lanolin S. S..... per gro. \$11.00
White Mountain S. S..... per gro. \$9.00
Green Mountain S. S..... per gro. \$8.00
Extra Indian Pond S. S..... per gro. \$7.50
No. 1 Indian Pond S. S..... per gro. \$7.00
No. 2 Indian Pond S. S..... per gro. \$6.50
Leader ed End S. S..... per gro. \$4.50
Balance of 1901 list 30¢

Oil Stones, &c.
Chicago Wheel & Mfg. Co. 90 list:
Gem Corundum Oil, Double Grit..... 5¢
Gem Corundum Oil, Single or Double
Grit..... 5¢
Gem Corundum Slips..... 5¢
Gem Corundum Razor Hones..... 5¢
Pike Mfg. Co. 1901 list:
Arkansas Stone, No. 1, 3 to 5 in..... \$2.50
Arkansas Stone, No. 1, 5 to 8 in..... \$3.50
Ark. 4 1/2 x 8 in..... \$4.00
Lily White Washita, 4 to 8 in..... 60¢
Roxley Washita, 4 to 8 in..... 60¢
Washita Stone, Extra, 4 to 8 in..... 60¢
Washita Stone, No. 1, 4 to 8 in..... 60¢
Lily White Slips, No. 1, 4 to 8 in..... 60¢
Roxley Slips, Extra..... 60¢
Washita Slips, Extra..... 60¢
Washita Slips, No. 1..... 60¢

Hindustan No. 1, Regular..... 40¢
Hindustan No. 1, Small..... 40¢
Axe Stones (all kinds)..... 55¢
Turkey Oil Stones, ex. 5 to 8 in...... 55¢
Queer Creek Stones, 4 to 8 in...... 30¢
Queer Creek Slips..... 40¢
Sand Stone..... 40¢
**Belgian, German and Swaty Razor
Hones**..... 40¢
Natural Grit Carving Knife Hones.....
per doz. \$2.00
Quick Edge Pocket Knife Hones.....
per doz. \$2.00
Mounted Kitchen Sand Stone.....
per doz. \$1.50

Emery Oil..... per doz. \$3.00..... 50¢@60¢

Stoners—
Enterprise..... 25¢@30¢

Stops, Bench—
Millers Falls..... 15¢@10¢
Morrill's..... 15¢@10¢
No. 1, 1/2 in. \$11.00..... 50¢@10¢

Stops, Window—
Ives' Patent..... 25¢@5¢

Stove Boards—
See Boards, Stove.

Stove Polish—See Polish, Stove.

Strainers, Pump—
Diamond Joe Pump Strainers, per doz. \$

Straps, Box—
Cary's Universal case lots..... 20¢@10¢

Stretchers, Carpet—
Cast Iron, Steel Points..... doz. 55¢@55¢
Socket..... doz. \$1.75

Strops, Razor—
Smith & Hemenway Co..... 7¢

Stuffers, Sausage—
Enterprise Mfg. Co..... 25¢@25¢@7 1/4¢
Nati na! Specialy Mfg. Co. list Jan.
1, 1901..... 80¢

Tacks Brads, &c.—
List Jan. 15, '99.
Carpet Tacks, American 90¢@1.00
American Cut Tacks..... 90¢@1.00
Suedes Iron Tacks..... 90¢@1.00
Suedes Upholsterers' Tacks.....
50¢@1.00
Gimp Tacks..... 90¢@1.00
Lace Tacks..... 90¢@1.00
Trimmers' Tacks..... 90¢@1.00
Looking Glass Tacks..... 70¢@1.00
Bill Posters' and Railroad Tack.....
90¢@1.00

Hungarian Nails..... 80¢@15¢
Common and Patent Brads..... 80¢@15¢
Trunk and Closet Nails..... 80¢@15¢

NOTE—The above prices are for
straight weights. An extra 5¢ is given
Star Weights. An extra 10¢ is on
Standard Weights.

Miscellaneous

Double Point Tacks..... 90¢@1.00 or 7 tens
**Steel Wire Brads, R. & E. Mfg.
Co.'s list**..... 50¢@1.00@1.05
See also Nails, Wire.

Tanks, Oil—
Emerald, S. S. & Co..... 30-gal. \$3.25
Emerald, S. S. & Co..... 60-gal. \$4.00
Queen City S. S. & Co., 0-gal..... \$3.50
Queen City S. S. & Co., 60-gal..... \$4.25

Tapes, Measuring—
American Asse's Skin..... 40¢@1.00@50¢
Patent Leather..... 25¢@30¢@5¢
Steel..... 10¢@10¢@5¢
Chesterman's..... 25¢@25¢@5¢
Eddy's Steel..... 40¢@40¢@5¢
Eddy's Metallic..... 30¢@30¢@5¢
Keuffel & Esser Co., Steel and Metallic.....
Lower list, 1899..... 30¢@30¢@5¢
Lufkin's Steel..... 30¢@30¢@5¢
Lufkin's Metallic..... 30¢@30¢@5¢

Teeth Harrow—
Steel Harrow Teeth, plain or head-
ed, bas. per lb..... 25¢

Thermometers—
Tin Case..... 80¢@1.00@30¢@10¢@5¢

Ties, Bale—Steel.
Standard Wire..... 50¢@1.00@5¢

Ties, Wall—
Cleveland Wire Spinning Co.:
4 in. steel 5 3/2 x 8 1/2 in. \$10.00, \$10.00
Galv. Steel 5 3/2 x 8 1/2 in. \$10.00, \$11.00
Galv. Steel 5 3/2 x 11 1/2 in. \$10.00, \$12.00
Galv. Steel 5 3/2 x 15 1/2 in. \$10.00, \$14.00

Tinners' Shears, &c.—
See Shears, Tinners', &c.

Tinware—
Stamped, Japanned and Pieced, sold
very generally at net prices.

**Tire Benders, Upsetters,
&c.**—See Benders and Upset-
ters, Tire.

Tobacco Cutters—
See Cutters, Tobacco.

Tools—
Coopers'—
L. & J. J. White..... 90¢@20¢@5¢

Ship—
L. & J. J. White..... 95¢

Transom Lifters—
See Lifters, Transom.

Traps—
Fly—
Balloon, Globe or Acme.....
doz. \$1.15@1.25; gro. \$10.50@11.00
Harper, Champion or Paragon
doz. \$1.25@1.40; gro. \$13.00@15.50

Game—
Oneida Pattern..... 75¢@1.00@50¢@5¢
Newhouse..... 45¢@45¢@5¢
Hawley & Norton..... 65¢@5¢@1.00
Victor (Oneida Pattern)..... 75¢@75¢
Star (Blake Pattern)..... 60¢@60¢@1.00

Mouse and Rat—
Mouse, Wood, Choker, doz. holes.....
8 1/2¢@9¢
Mouse, Round or Square Wire.....
doz. \$0.85@1.00
American Pattern French Rat and Mouse
Traps.....
No. 1, Detroit Marty Pattern, per doz.
\$4.50; in 1/4 gro. lots, per doz. \$4.00
No. 2, Detroit Marty Pattern, per doz.
\$4.50; in 1/4 gro. lots, per doz. \$4.00
Detroit Marty Pattern Mouse, per doz.
\$2.00; in 1/4 gro. lots, per doz. \$1.75
Diamond Joe Mouse Traps..... per doz. \$1.00
Diamond Joe Rat Traps..... per doz. \$1.00
War French Rat and Mouse Traps
(Genuine):
No. 1, Rat, Each \$1.12 1/2; per doz. \$12.00
No. 3, Rat, per doz. \$6.00; case of 50
\$3.25 doz.
No. 3 1/2, Rat, per doz. \$4.75; case of 72
\$4.25 doz.
No. 4, Mouse, per doz. \$3.50; case of 72
\$2.75 doz.
No. 5, Mouse, per doz. \$2.75; case of 150
\$2.25
Schuyler's Rat Killer, No. 1, per gr. \$30.00;
No. 2, per gr. \$30.00; Mouse, No. 3,
\$18.00..... 5¢

Target—
Markle's, each..... \$3.50

Trimmers, Spoke—
Bonney's No. 1 and 2..... 40¢

Trowels—
Dutton Brick and Point ng..... 30¢
Dutton Plastering..... 25¢
Dutton Standard Brand 1" an 4-oz.
Dutton Trowel..... 40¢
Never-Break Steel Garden Trowels.....
gro. \$7.00
Pease's Plastering..... 30¢
Rose Brick and Plastering..... 25¢
Woodrough & McParlin, Plastering..... 25¢

Trucks, Warehouse, &c.—
R. & L. Block Co.'s list..... 50¢
Daisy Stove Trucks, improved pattern.....
per doz. \$18.50
Model Stove Trucks..... per doz. \$18.50

Tub, Wash—
No. 1 \$ \$ \$
Galvanized, per doz. \$5.00 5.50 6.00
Galvanized Wash tubs, S. S. & Co.:
No. 1 2 3 10 20 30
per doz \$5.25 6.00 6.75 8.50 7.25 8.00

Twine—
Miscellaneous—
Flax Twine— BC R.
No. 1, 1/4 and 1/2-lb. Balls..... 24¢
No. 2, 1/4 and 1/2-lb. Balls..... 20¢
No. 3, 1/4 and 1/2-lb. Balls..... 18¢
No. 4, 1/4 and 1/2-lb. Balls..... 17¢
No. 5, 1/4 and 1/2-lb. Balls..... 15¢

Chalk Line, Cotton, 1/2-lb. Balls.....
22¢@22 1/2¢

**Cotton Mops, 6, 9, 12 and 15 lb. to
doz**..... 7¢@8¢

**Cotton Wrapping, 5 Balls to lb.
according to quality**..... 10¢@12¢

**American 3-Ply Hemp, 1/4 and 1/2-lb.
Balls**..... 15¢@16¢

American 5-Ply Hemp, 1-lb. Balls.....
15¢@16¢

**India 2-Ply Hemp, 1/4 and 1/2-lb.
Balls (Spring Teine)**..... 15¢
India 5-Ply Hemp, 1-lb. Balls..... 15¢
India 3-Ply Hemp, 1 1/2-lb. Balls..... 15¢
2, 3, 4 and 5-Ply Jute, 1/2-lb. Balls.....
9 1/2¢@10¢

Mason Line, Linen, 1/4-lb. Balls..... 15¢
No. 264 Mattress, 1/4 and 1 1/2-lb. Balls.....
5¢@6¢
Wool, 3 to 6 ply..... 5¢@6¢

Vises—
Solid Box..... 50¢@50¢@10¢

Parallel—
Athol Machine Co.:
Simpson's Adjustable..... 40¢
Standa d..... 40¢
Amateur..... 25¢
Bonney's..... 40¢
Columbian Hdw Co..... 40¢
Fisher & Norris Double Screw..... 15¢@10¢
Holland's..... 40¢
Machinists'..... 40¢
Key-tone..... 65¢@5¢
Lewis Tool Co..... 20¢@30¢
Massey's Perfect..... 15¢@20¢
Massey's..... 80¢@4¢
Combination, Quick Adj..... 40¢
Woodworker's..... 15¢@20¢
Morrill's..... 20¢
Miller's Falls..... 50¢@10¢@10¢
Parker's..... 20¢@25¢
Victor..... 20¢@25¢
Regulars..... 40¢@45¢
Combination Pipe..... 50¢@60¢
Prentiss..... 20¢@25¢
Sargent's..... 40¢
Snediker's X. L..... 20¢@25¢
Stephens'..... 20¢@25¢

Saw Filers—
Bonney's, No. 1, \$13; No. 3, \$16..... 50¢
Dixon's D-3 Clamp and Guide, \$12.....
\$30..... 25¢
Reading..... 60¢
Wentworth's Rubber Jaw, Nos. 1, 2
and 3..... 45¢@50¢

Miscellaneous—
Signal & Keeler Combination Pipe
Vise..... 60¢
Parker's Combination Pipe:
87 Series..... 60¢
187 Series..... 60¢@5¢
No. 870..... 40¢

Wads—Price Per M.
B. E. 11 up..... 60¢
B. E. 9 and 10..... 70¢
B. E. 8..... 80¢
B. E. 7..... 80¢
P. E. 11 up..... 1.00
P. E. 9 and 10..... 1.25
P. E. 8..... 1.50
P. E. 7..... 1.50
Ely's B. E. 11 and larger..... \$1.70@1.75
Ely's P. E. 12 to 20..... \$3.00@3.25

Wagon Jacks—
See Jacks, Wagon.

Ware, Hollow—
Aluminum—
S. S. & Co. Reduced list..... 40¢

Cast Iron, Hollow—
Stove Hollow Ware:
Ground..... 65¢
Unground..... 70¢
White Enamelled Ware.....
Maslin Kettles..... 75¢@1.00@50¢
Covered Ware:
Painted and turned..... 40¢@1.00@1.05
Enamelled and Plain..... 50¢@1.00@1.05
See also Pots, Glue.

Enamelled—
Agate Nickel Steel Ware, list Nov. 1,
1901..... 70¢@1.00
Iron Hdl Ware..... 70¢@1.00
Never Break Enamelled..... 50¢@50¢@1.00

Tea Kettles—
Galvanized Tea Kettles:
Inch..... 5 7 8 9
Each..... 45¢ 50¢ 55¢ 65¢

Steel Hollow Ware—
Avery Spiders & Griddles..... 65¢@65¢@5¢
Avery Kettles..... 60¢@50¢@1.00
Porcelain..... 50¢@50¢@1.00
Never Break Spiders and Griddles..... 65¢@5¢

Never Break Kettles..... 60¢
Solid Steel Spiders & Griddles..... 65¢@5¢
Solid Steel Kettles..... 60¢
Solid Steel Ware, Enamelled..... 50¢@5¢

Washboards—
Solid Zinc..... per doz
Crescent, family size, bent frame, \$3.00
Red Star, family size, stationary
protector..... \$3.00
Double Zinc Surface:
Saginaw Globe, family size, station-
ary protector..... \$2.85
Cable Cross, family size, stationary
protector..... \$2.90

Single Zinc Surface—
Balad, family size, open back perfo-
rated..... \$2.40
Saginaw lobe, protector, family
size, vented back..... \$2.35

Brass Surface:
Br. King, Single Surface, open
.....\$3.00
Nickel Plate Surface:
No. 1 Nickel Plate, Single Surface
.....\$3.00

Washers—
Leather, Axle—
Solid.....\$5.00
Patent.....\$5.00
Cot.....\$5.00
10c 1lb. 12c per 100

Iron or Steel
Size 1/2 5-16 3/8 1/2 5/8 3/4
Washers.....\$5.00 4.0 2.0 2.0 2.5
In less than one keg add 1/4c per
lb., 1lb. boxes add 1/4c to list.
Cast washers—
Over 1/2 inch, barrel lots, per lb.
.....1 1/4c @ 1/4c

Washer Cutters—
See Cutters, Washer.
Washing Machines—
See Machines, Washing.
Water Coolers—
See Coolers, Water.
Wedges—
Oil Finish.....lb. 2.90 @ \$3.00
Weights, Sash
Per ton, f.o.b. factory.....\$21.00 @ \$22.00

Some Foundries make price \$1 @ \$1
lower.
Well Buckets, Galvanized
See Pails, Galvanized.
Wheels Well—
8-in. \$1.45 @ 1.65; 10-in., \$1.75 @ 2.00;
12-in., \$2.35 @ 2.50; 14-in., \$3.50 @ 3.75

Wire and Wire Goods—
Bright and Annealed:
6 to 9.....7 1/2 @ 5 @ 7 1/2 @ 10 @
10 to 15.....7 1/2 @ 10 @ 7 1/2 @ 10 @
15 to 25.....7 1/2 @ 10 @ 7 1/2 @ 10 @
27 to 35.....7 1/2 @ 10 @ 7 1/2 @ 10 @
Galvanized:
6 to 15.....70 @ 70 @ 5 @
11 to 25.....7 1/2 @ 5 @ 7 1/2 @ 10 @
27 to 35.....7 1/2 @ 1 @ 7 1/2 @ 1 @ 5 @
Coppered:
6 to 9.....70 @ 70 @ 70 @ 10 @
10 to 15.....70 @ 70 @ 70 @ 10 @
15 to 25.....7 1/2 @ 1 @ 7 1/2 @ 1 @ 5 @
27 to 35.....7 1/2 @ 1 @ 7 1/2 @ 1 @ 5 @
Tinned:
6 to 15.....75 @ 75 @ 7 1/2 @
15 to 18.....7 1/2 @ 1 @ 7 1/2 @ 1 @
19 to 25.....70 @ 5 @ 70 @ 10 @
27 to 35.....70 @ 5 @ 70 @ 10 @
Annealed Wire on Spools, 70 @ 5 @ 70 @ 10 @

Brass and Copper Wire on Spools..
60 @ 5 @ 50 @ 10 @
Brass, list Feb. 25, '98.....25 @
Copper, list Feb. 25, '98.....15 @
Cad Steel Wire.....50 @
Stub's Steel Wire.....\$5.00 to \$2.40
Wire Cloth and Netting—
Galvanized Wire Netting, 8 1/2 @ 20 @
Painted Screen Cloth per 100 ft. \$1.50
Light Hardware Grade:
2-18 Mesh, Plain (Sc. list) 87 ft.
.....1 1/4 @ 1 1/4 @
2-18 Mesh, Galv. (Sc. list) 87 ft.
.....2 1/4 @ 2 1/4 @
Wire, Barb—See Trade Report.
Wire Ro e—See Rope, Wire.
Wrenches—
Agricultural.....70 @ 10 @ 75 @ 10 @
Case Lbs.....75 @ 10 @
Acme.....60 @ 10 @
Sienna, Raw.....10 @ 13 @
Sienna, Burnt.....10 @ 13 @
Umber, Raw.....9 @ 12 @
Umber, Burnt.....9 @ 12 @
Miscellaneous.
Barytes, Foreign, # ton.....\$19.00 @ \$21.00
Barytes, Amer. 100 lbs.....19.00 @ 20.00
Bar, tes, Crude, No. 1.....9.00 @ 10.00
Chalk, in bulk.....# ton 2.50 @ 2.60
Chalk, in bbls.....# 100 @ 35
China Clay, English, # ton 12.00 @ 17.50
Cobalt, Oxide.....# 100 @ 2.25 @ 2.50
Whiting, common, # 100 @ 40 @ 60
Whiting, Gliders.....45 @ 55
Whiting, extra Gliders.....55 @ 65
Putty.
In bladders.....\$2.45
In but.....1.25
In cas 1 lb to 5 lb.....3.25
In cas 12 lb to 25 lb.....2.45
Spirits Turpentine.
In southern bbls.....37 1/2 @ 39
In machine bbls.....38 @ 38 1/2
Glue.
Cabinet.....11 1/4 @ 16
Extra White.....13 @ 21
French.....13 @ 40
Irish.....13 @ 13
Low Grade.....# 9 @ 12
Medium White.....14 1/4 @ 18 1/4
Animal, Fish and Veget-
table Oils.
Linseed, City, raw.....# gal. 55 @ 58

Combination Black.....40 @ 55
Combination Bright.....40 @
Cylinder or Gas Pipe.....55 @
Extra Heavy.....55 @
Herrick's Patent.....50 @
No. 3 Pipe, bright.....55 @
Indley Automatic.....30 @
Boar Man's.....35 @
Coe's Genuine.....40 @ 10 @ 15 @
Coe's "Mechanical".....40 @ 10 @ 15 @
Donohue's Engineer.....50 @ 10 @
Ends.....40 @ 10 @
Elm Wrench.....40 @
Elm Monkey Wrench Pipe Jaws.....30 @
Ends Pocket.....30 @
Herrick's.....70 @
Knife Hand e, Machinists' (W. & B.).....50 @ 55
Less than.....50 @ 55
Improved Pipe (W. & B.).....50 @ 55
Solid Handles, P.S. & W.....50 @ 55
Triumph.....6 @ 10 @
Wrought Goods—
Staples, Hooks, etc., list March 17
Yokes Neck—
Covert Sad Hery Works, Trimma 1.00 @ 1.50
Covert Saddlery Works, Neck Yoke
Centare.....70 @
Yokes, Ox, and Ox Rows—
Fort Madison's Farmers & Freighters'.....list act
Zinc—
Sheet.....lb 6 @ 6 @ 40

PAINTS, OILS AND COLORS—Wholesale Prices.

White Lead, Zinc, &c.
Lead, Engl. sh white, in Oil.....@ 9 1/2
Lead, American White, in Oil:
Lots of 500 lb or over.....@ 7
Lots less than 500 lb.....@ 7 1/2
Lead, White, in oil, 25 lb tin
pails, add to keg price.....@ 1 1/2
Lead, White, in oil, 12 1/2 lb tin
pails, add to keg price.....@ 1
Lead, White, in oil, 1 to 5 lb as-
sorted tins, add to keg price.....@ 1 1/4
Lead White, Dry in bbls.....5 1/4 @ 6
Lead, American, Terms: On lots of 500
lbs. and over, 60 days, or 2% for cash if
paid in 15 days from date of invoice.
Zinc, American, dry.....# 43 @ 45 1/2
Zinc, Paris, Red Seal, dry.....@ 4 1/2
Zinc, Paris, Green Seal, dry.....@ 4 1/2
Zinc, Antwerp Red Seal, dry.....@ 4 1/2
Zinc, Antwerp, Green Seal, dry.....@ 4 1/2
Zinc, V. M. French, in Poppy Oil,
Green Seal:
Lots of 1 ton and over.....12 @ 12 1/2
Lots of less than 1 ton.....12 1/2 @ 12 3/4
Zinc, V. M. French, in Poppy Oil,
Red Seal:
Lots of 1 ton and over.....10 1/2 @ 11 1/4
Lots of less than 1 ton.....11 @ 11 1/4
DISCOUNTS.—V. M. French Zinc.—Dis-
counts to buyers of 10 bbl. lots of one or
over grades, 1%: 25 bbls., 2%: 50
bbls., 4%.
Dry Colors.
Black, Carbon.....# 8 @ 20
Black, Drop, Amer.....4 @ 7
Black, Drop, Eng.....7 @ 11
Black, Ivory.....12 @ 21
Lamp, Com.....4 1/4 @ 6
Blue, Celestial.....# 4 @ 6
Blue, Chinese.....30 @ 35
Blue, Prussian.....25 @ 34
Blue, Ultramarine.....4 @ 20
Brown, Spanish.....4 @ 1
Brown, Vandyke, Amer.....1 1/4 @ 2 1/4
Brown, Vandyke, Foreign.....2 1/4 @ 3 1/4
Carmine, No. 40.....# 2.05 @ 2.75
Green, Chrome, ordinary.....5 @ 6 1/2

Green, Chrome, pure.....18 @ 20
Lead, Red, bbls. 1/2 bbls. and kegs:
Lots 500 lb or over.....@ 8
Lots less than 500 lb.....@ 8 1/2
Litharge, bbls. 1/2 bbls. and kegs:
Lots 500 lb or over.....@ 6
Lots less than 500 lb.....@ 6 1/2
Ocher, Dutch Washed.....4 1/2 @ 5 1/2
Ocher, American.....# ton \$10.00 @ \$15.00
Orange Mineral, English.....# 8 @ 11 1/2
Orange Mineral, French.....11 @ 13 @ 11 1/2
Orange Mineral, German.....8 @ 10 1/2
Orange Mineral, American.....8 @ 8 1/2
Red, Indian, English.....4 1/2 @ 5 1/2
Red, Turkey, English.....4 @ 6
Red, Tuscan, English.....7 @ 10
Red, Venetian, Amer.....# 100 @ 80 @ 1.75
Red Venetian, English.....# 100 @ 1.80 @ 3.00
Sienna, Italian, Burnt and
Powdered.....# 3 1/4 @ 7 1/2
Sienna, Ital., Raw, Powd.....3 1/4 @ 7
Sienna, American, Raw.....1 1/4 @ 2
Sienna, American, Burnt and
Powdered.....# 1 1/4 @ 2
Talc, French.....# 100 @ \$1.25 @ 1.50
Talc, American.....90 @ 1.10
Terra Alba, French, # 100 @ .95 @ 1.00
Terra Alba, English......95 @ 1.00
Terra Alba, American No. 1......45 @ .50
Terra Alba, American No. 2......45 @ .50
Umber, Turkey, Bnt. & Pow.....2 1/4 @ 3 1/4
Umber, Turkey, Raw & Powd.....2 1/4 @ 3 1/4
Umber, Bnt. Amer.....1 1/4 @ 2
Umber, Raw, Amer.....1 1/4 @ 2
Yellow, Chrome.....10 1/2 @ 25
Vermilion, American Lead.....10 @ 10
Vermilion, Quicksilver, bulk.....@ 70
Vermilion, Quicksilver, bags.....@ 71
Vermilion, English, Import.....@ 95
Vermilion Chinese.....\$1.05 @ 1.20
Colors in Oil.
Black, Lampblack.....12 @ 14
Blue, Chinese.....36 @ 40
Blue, Prussian.....32 @ 36
Blue, Ultramarine.....12 @ 14

Brown, Vandyke.....9 1/2 @ 13
Green, Chrome.....10 @ 12
Green, Paris.....@ 21
Sienna, Burnt.....10 @ 13
Umber, Raw.....9 @ 12
Umber, Burnt.....9 @ 12
Miscellaneous.
Barytes, Foreign, # ton.....\$19.00 @ \$21.00
Barytes, Amer. 100 lbs.....19.00 @ 20.00
Bar, tes, Crude, No. 1.....9.00 @ 10.00
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In southern bbls.....37 1/2 @ 39
In machine bbls.....38 @ 38 1/2
Glue.
Cabinet.....11 1/4 @ 16
Extra White.....13 @ 21
French.....13 @ 40
Irish.....13 @ 13
Low Grade.....# 9 @ 12
Medium White.....14 1/4 @ 18 1/4
Animal, Fish and Veget-
table Oils.
Linseed, City, raw.....# gal. 55 @ 58

Linseed, City, bottle.....57 @ 58
Linseed, 3 rate and Wash, raw.....53 @ 55
Linseed, raw Calcutta.....7 @ 25
Lard, Prime.....50 @ 55
Lard, Extra No. 1.....4 @ 4 1/2
Lard, No. 1.....4 @ 4 1/2
Cotton-seed, Crude.....@ 37
Cotton-seed, Summer Yellow.....@ 37
Cotton-seed, Summer Yellow,
off grades.....34 @ 35
Sperm, Crude.....@ 35
Sperm, Natural Spring.....60 @ 61
Sperm, Bleached Spring.....61 @ 62
Sperm, Natural Winter.....61 @ 62
Sperm, Bleached Winter.....61 @ 62
Tallow, Prime.....67 @ 68
Whale, Crude.....45 @ 46
Whale, Natural Winter.....45 @ 46
Whale, Bleached Winter.....47 @ 48
Menhaden, Crude, No ind.....31 @ 32
Menhaden, Light Str. red.....31 @ 32
Menhaden, Bleached Winter.....35 @ 36
Menhaden, Ex Bleached Winter.....37 @ 38
Cocoanut, Ceylon.....7 1/4 @ 7 1/2
Cocoanut, Cochin.....7 1/2 @ 7 1/2
Cod, Domestic.....83 @ 84
Cod, Newfoundland.....85 @ 86
Red Fatne.....@ 12
Red Saponified.....# 5 @ 6 1/4
Olive, Italian, bbls.....58 @ 63
Neatsfoot, prime.....59 @ 61
Palm, prime, Lagos.....# 5 1/2 @ 5 1/2
Mineral Oils.
Black, 20 gravity, 25 @ 30 cold
test.....# gal. 9 1/4 @ 10 1/4
Black, 20 gravity, 15 cold test, 10 @ 11 1/4
Black, 20 gravity, 15 cold test, 10 @ 11 1/4
Cylinder, light filtered.....14 1/4 @ 17 1/4
Cylinder, dark filtered.....11 1/4 @ 15 1/4
Paraffine, 90 @ 97 gravity.....12 1/4 @ 13 1/4
Paraffine, 90 @ 97 gravity.....11 1/4 @ 13 1/4
Paraffine, 88 @ 93 gravity.....9 1/4 @ 11
Paraffine, red, No. 1.....12 1/4 @ 13 1/4
In small lots 1/4c advance.

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CURRENT METAL PRICES.

NOVEMBER 27, 1901.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from Store—

Common Iron: Duty, Round, 0.6¢ # 1 to 1 1/2 in. round and square	1.90@2.00
1 1/2 to 4 in. x 1/2 to 1 in.	2.05@2.15
Refined Iron:	
1 to 1 1/2 in. round and square	2.05@2.15
1 1/2 to 4 in. x 1/2 to 1 in.	2.20@2.30
Rods—3/4 and 1-1/2 round and square	2.30@2.40
Angles:	
3 in. x 1/2 in. and larger	2.50
3 to 3 1/2 in. x 3/4 in.	2.50
1 1/2 to 3 in. x 1/2 in.	2.50
1 1/2 to 2 1/2 in. x 3/4 in. and thicker	2.20@2.30
1 to 1 1/2 in. x 3/4 in.	2.30@2.40
1 to 1 1/2 in. x 3/4 in.	2.40@2.50
1/2 x 1/2 in.	2.75
1/2 x 1/2 in.	3.50
1/2 x 3/4 in.	4.50

Tees:	
1 in.	2.80
1 1/2 in.	2.80
1 1/2 in. and larger	3.00
Beams:	
Channels, 8 in. and larger	3.00
Rails—1 1/2 to 6 x 3/4 to No. 8	2.30
"Burden's Best" Iron, base price	3.15
Burden's "H. B. & S. Iron, base price	2.95
"Uster"	3.60
Norway Bars	3.75@4.25
Norway Shapes	4.00@4.50

Merchant Steel from Store—

Best Cast Steel, base price in small lots	7 1/2¢
small lots	6¢

Soft Steel Sheets—

1/4 inch	2.20	No. 14	3.00
3/8 inch	2.30	No. 16	3.20
No. 8	2.40	No. 18	3.40
No. 10	2.60	No. 20	3.70
No. 12	2.90	No. 22	3.90

Sheet Iron from Store.

Black.

One Pass, C. R.	R. G.
No. 14 to 16	3.70
No. 18 to 20	3.75
No. 22 to 24	3.85
No. 26 to 28	3.95
No. 30	4.05
No. 32	4.15
No. 34	4.20

Russia, Planished, &c.

Genuine Russia, according to assortment	11@13
Patent Planished	11@13
Galvanized.	

Foreign Steel from Store—

Best Cast	15¢
Extra Cast	18¢
Swaged Cast	18¢
Best Double Sheet	15¢
Blister, 1st quality	13¢
German Steel, Best	10¢
2d quality	9¢
3d quality	8¢
Sheet Cast Steel, 1st quality	15¢
2d quality	14¢
3d quality	12¢
R. Mascher's "Special"	46¢
"Titanic" Annealed	75¢
Hobson's Choice X. X. Extra Best	35¢
Jensop Self-Hardening	40¢
Seamless "Nelson" Steel	40¢
Hobson's "Soho" Special Self-Hardening	43¢

METALS—

Tin—

Duty.—Pigs, Bars and Block.	Free.
Banca, Pigs	29¢
Straits, Pigs	24¢
Straits in Bars	20¢

Tin Plates—

American Charcoal Plates.

Calland Grade:	
IC, 14 x 20	7.25
IX, 14 x 20	8.75
Melyn Grade:	
IC, 14 x 20	6.75
IX, 14 x 20	8.25
Allaway Grade:	
IC, 14 x 20	6.95
IX, 14 x 20	7.95

American Coke Plates—Bessemer—

IC, 14 x 20	108¢
IX, 14 x 20	108¢

American Terne Plates—

IC, 20 x 24	11.00@11.25
IX, 20 x 24	13.00@13.25

Tin Boiler Plates, American—

XX, 14 x 26	112 sheets
XX, 14 x 28	112 sheets
XX, 14 x 31	112 sheets

Copper—

Duty: Pig, Bar and Ingot and Old Copper free	
Manufactured, 9 1/2¢ # lb.	

Ingot—

Large	17 1/4¢ @ 17 1/2¢
Small grade Casting	16 1/2¢ @ 17¢

Sheet and Bolt—

January 19, 1900.

Prices, in cents per pound.

Sheet 30 x 60.

Not wider than	Not longer than	And longer than	44 oz. & over, gold sheet, 30 x 60 and heavier	30 oz. to 44 oz. 3/4	24 oz. to 30 oz. 3/4	16 oz. to 24 oz. 3/4	12 oz. to 16 oz. 3/4	10 oz. to 12 oz. 3/4	8 oz. to 10 oz. 3/4	6 oz. to 8 oz. 3/4	4 oz. to 6 oz. 3/4	2 oz. to 4 oz. 3/4	1 oz. to 2 oz. 3/4	Lighter than 8 oz.
Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
54	54	54	54	54	54	54	54	54	54	54	54	54	54	54
60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
72	72	72	72	72	72	72	72	72	72	72	72	72	72	72
78	78	78	78	78	78	78	78	78	78	78	78	78	78	78
84	84	84	84	84	84	84	84	84	84	84	84	84	84	84
90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
108	108	108	108	108	108	108	108	108	108	108	108	108	108	108
114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
132	132	132	132	132	132	132	132	132	132	132	132	132	132	132
138	138	138	138	138	138	138	138	138	138	138	138	138	138	138
144	144	144	144	144	144	144	144	144	144	144	144	144	144	144
150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
156	156	156	156	156	156	156	156	156	156	156	156	156	156	156
162	162	162	162	162	162	162	162	162	162	162	162	162	162	162
168	168	168	168	168	168	168	168	168	168	168	168	168	168	168
174	174	174	174	174	174	174	174	174	174	174	174	174	174	174
180	180	180	180	180	180	180	180	180	180	180	180	180	180	180
186	186	186	186	186	186	186	186	186	186	186	186	186	186	186
192	192	192	192	192	192	192	192	192	192	192	192	192	192	192
198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
204	204	204	204	204	204	204	204	204	204	204	204	204	204	204
210	210	210	210	210	210	210	210	210	210	210	210	210	210	210
216	216	216	216	216	216	216	216	216	216	216	216	216	216	216
222	222	222	222	222	222	222	222	222	222	222	222	222	222	222
228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
234	234	234	234	234	234	234	234	234	234	234	234	234	234	234
240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
246	246	246	246	246	246	246	246	246	246	246	246	246	246	246
252	252	252	252	252	252	252	252	252	252	252	252	252	252	252
258	258	258	258	258	258	258	258	258	258	258	258	258	258	258
264	264	264	264	264	264	264	264	264	264	264	264	264	264	264
270	270	270	270	270	270	270	270	270	270	270	270	270	270	270
276	276	276	276	276	276	276	276	276	276	276	276	276	276	276
282	282	282	282	282	282	282	282	282	282	282	282	282	282	282
288	288	288	288	288	288	288	288	288	288	288	288	288	288	288
294	294	294	294	294	294	294	294	294	294	294	294	294	294	294
300	300	300	300	300	300	300	300	300	300	300	300	300	300	300

Rolls Round Copper, 3/4 inch diameter and over, 2¢ # lb.
Circles, Segments and Pattern Sheets, 3¢ # lb. advance over price of Sheet Copper required to cut them from.
Cold or Hard Rolled Copper, 14 oz. square foot and heavier, 1¢ # lb. over the foregoing price.
Cold or Hard Rolled Copper, lighter than 14 oz. square foot, 2¢ # lb. over the foregoing price.
All Polished Copper, 20 in. wide and under 1¢ # lb. advance over the price for Cold Rolled Copper.
All Polished Copper, over 20 in. wide, 2¢ # lb. advance over the price for Cold Rolled Copper.

Planished Copper—

1¢ # lb. more than Polished Copper.

Copper Bottoms, Pits and Flats—

14 oz. to square foot and heavier, 2¢ # lb. advance over price of Sheet Copper required to cut them from.
12 oz. and up to 14 oz. to square foot, 2¢ # lb. advance over the price for Cold Rolled Copper.
10 oz. and up to 12 oz. to square foot, 2¢ # lb. advance over the price for Cold Rolled Copper.
Lighter than 10 oz. to square foot, 3¢ # lb. advance over the price for Cold Rolled Copper.
Circles less than 8 in. diameter, 2¢ # lb. additional.
Circles over 8 in. diameter are not classed as Copper Bottoms.

Copper Wire—

Hard and Soft Drawn—R. & S. Gauge.

Last March 1, 1901.

No.	Base	11 and 12
No. 10,000 to 9	14	15
No. 10,000 to 13	14	15
No. 10,000 to 16	14	15
No. 10,000 to 19	14	15
No. 10,000 to 22	14	15
No. 10,000 to 25	14	15
No. 10,000 to 28	14	15
No. 10,000 to 31	14	15
No. 10,000 to 34	14	15
No. 10,000 to 37	14	15
No. 10,000 to 40	14	15
No. 10,000 to 43	14	15
No. 10,000 to 46	14	15
No. 10,000 to 49	14	15
No. 10,000 to 52	14	15
No. 10,000 to 55	14	15
No. 10,000 to 58	14	15
No. 10,000 to 61	14	15
No. 10,000 to 64	14	15
No. 10,000 to 67	14	15
No. 10,000 to 70	14	15
No. 10,000 to 73	14	15
No. 10,000 to 76	14	15
No. 10,000 to 79	14	15
No. 10,000 to 82	14	15
No. 10,000 to 85	14	15
No. 10,000 to 88	14	15
No. 10,000 to 91	14	15
No. 10,000 to 94	14	15
No. 10,000 to 97	14	15
No. 10,000 to 100	14	15

Seamless Brass Tubes—

Standard always Stub's gauge, unless otherwise ordered.

Feb. 6, 1899.

Net. Outside Diameter.

Stub's W. G.	B. & S. W. G.	1/4
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